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TOXIC EFFECTS IN WOMEN EXPOSED TO INDUSTRIAL RUBBER SOLUTIONS

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This paper is the result of two years' investigation of the effects of industrial rubber solutions on the workers using them. Nowadays these are almost exclusively women. The solutions contain varying amounts of benzine and of the aromatic hydrocarbons benzene, xylene, and toluene; xylene and toluene are less toxic than benzene, but the latter is still used because of the difficulty of obtaining the former in sufficient amounts. Factory conditions have been much improved in recent years, and fatal cases of benzene poisoning are fortunately extremely rare; but even mild benzene intoxication may lead to irreversible changes in the haemopoietic bone marrow; also some people seem particularly susceptible, and develop signs of poisoning with only a limited exposure, particularly pregnant women (Meda, 1922; Hamilton, 1925; Smith, 1928; Hamilton-Paterson, 1941). It was hoped that as the result of this investigation it would be possible to identify early cases of benzene absorption and remove them from contact before any permanent changes ensued. That this is possible will be clearly shown, and also that, with suitable periods of "rest," no harm will accrue to those who continue to work under these conditions.

Rubber solutions are used for a variety of purposes in industry, but this investigation was confined to their employment in a special manufacturing process in the aircraft industry. The examinations were carried out in 13 factories scattered over the country. The investigation has been conducted in two parts. In the first, sample groups in each factory, totalling 200 women, were clinically examined and had blood counts made. These counts have been compared with the counts of 200 control women. In the second part of the investigation all the women working in one factory have been similarly compared with a group of women in the same factory who had never been in contact with rubber solution. The effects of "rest" were also studied in this group of women. The manufacturing process in question involves the use of rubber solution and adhesive "cements" which contain aromatic hydrocarbons varying in strength from 5 to 20%; in practically all some proportion of this is benzene. Even though adequate ventilation is provided, as required under the India-rubber Regulations, 1922 (S.R. & O. No. 329), it is almost impossible for a woman, working in certain positions with a brush and an open pot of solution, not to inhale the fumes. In this way she is probably exposed to a concentration of benzene nearly as high as that in the solution itself. The practice in some workshops, under intensive production, of allowing large numbers of treated articles to remain in the workroom until perfectly dry may result in a further increase of the general atmospheric content of benzene. It should be remembered in this connexion that the general atmospheric concentration of benzene is by no means an entirely reliable criterion of benzene exposure, since individual workers may at any time be exposed to localized "pockets" of high concentration, particularly when working over open containers.

Clinical Results

A routine clinical examination, including condition of teeth, throat, lungs, heart, skin, and in many cases blood-pressure readings, was carried out, and a careful case history taken. The chief points to which attention was paid in the case history were:

1. *Previous Occupation.*—A history of previous exposure to any toxic substance would naturally have to be taken into account in evaluating any disturbance of health or deviation from the normal blood picture. Since many of these women were in the 35–45 age group the previous occupation of a large proportion (about 40%) had been domestic. Among the other occupations represented were clerks, telephonists, waitresses, shop assistants, hairdressers, dressmakers, mill-hands, weavers, and machinists. Only in two cases was there a history of occupation which possibly involved exposure to toxic solvents—one a rubber worker, the other a cleaner of aeroplanes. In both, the blood picture was within normal limits and there were no complaints of ill-health.

2. *Previous Illness.*—No history of previous illness likely to produce haematological disturbance was obtained except "long-standing anaemia" in one case, with a blood picture of mild microcytic hypochromic anaemia only. In 84% of all cases, in fact, no history of illness other than "childish diseases" was elicited; the remaining 16% gave a history of bronchitis (7 cases), tonsillitis (4), appendicitis (3), pneumonia (2), jaundice (1), rheumatic fever (3), heart trouble (2), gastric ulcer (1), gastritis (1), asthma (1).

3. *Symptoms.*—In all, 72 of the 176 women examined (approximately 41%) complained of symptoms probably referable to their occupation. These were in most cases not severe, and were in the following order of frequency:

(*a*) Lassitude (35).—Many of the women emphasized the fact that their fatigue, especially at night, had been particularly noticeable "since being on this job." It is possible, of course, that this symptom—particularly in women previously engaged in domestic work only, and now doing 47 to 55 hours a week in the factory, with some domestic duties in addition—may be attributed to excessive exertion rather than to benzene absorption; but many of the women appeared to relate their fatigue definitely to their occupation.

(*b*) Headache (27).

(*c*) Dizziness (25).—In one factory this symptom took an acute form, 18 women being overcome in one day by what they described as "fainting attacks" and "feeling drunk." Investigation showed that these attacks were very similar to the "benzine intoxication" reported by Kobert (1906) and others, and that the solutions used did in fact contain a high proportion of benzine. A combination of heavy fog, poor ventilation, and intensive production on the day on which this incident occurred was probably responsible for a sudden increase of the benzine content of the air of the workshop.

(*d*) Nausea (15).—The nausea and vomiting are probably not due to benzene but to other fumes evolved during the process. They seemed to be most pronounced in the mornings, particularly Monday mornings, when the shops had been closed over the week-end, and the fumes from the drying treated articles had accumulated.

(*e*) Vomiting (4). (*f*) Dyspnoea (6). (*g*) Loss of weight (3). (*h*) Gastric pain (2). (*i*) Bleeding from the gums not accounted for by local oral conditions (2).

An unusual complaint, for which no satisfactory explanation can at present be given, was that volunteered by several women that the faeces smelt strongly of the rubber solutions used.

4. *Menstrual Disturbance.*—Of these women 45 were between the ages of 40 and 55, and 7 of them complained of menorrhagia; this may probably be attributed to menopausal or pre-menopausal disturbance rather than to a benzene effect. Of the 131 younger women (aged 19 to 39) 4 complained of increased frequency of periods (which may have been associated with the change from domestic to factory life), and only one of recently increased loss. Five women were pregnant, but their health did not seem to be affected.

Haematological Results

The blood counts of the 200 women working with rubber solution have been analysed and compared with the counts of a group of 200 women, of similar age and conditions of life, who, so far as was known, had never been in contact with rubber solution. The results are shown in the accompanying Chart, in which frequency

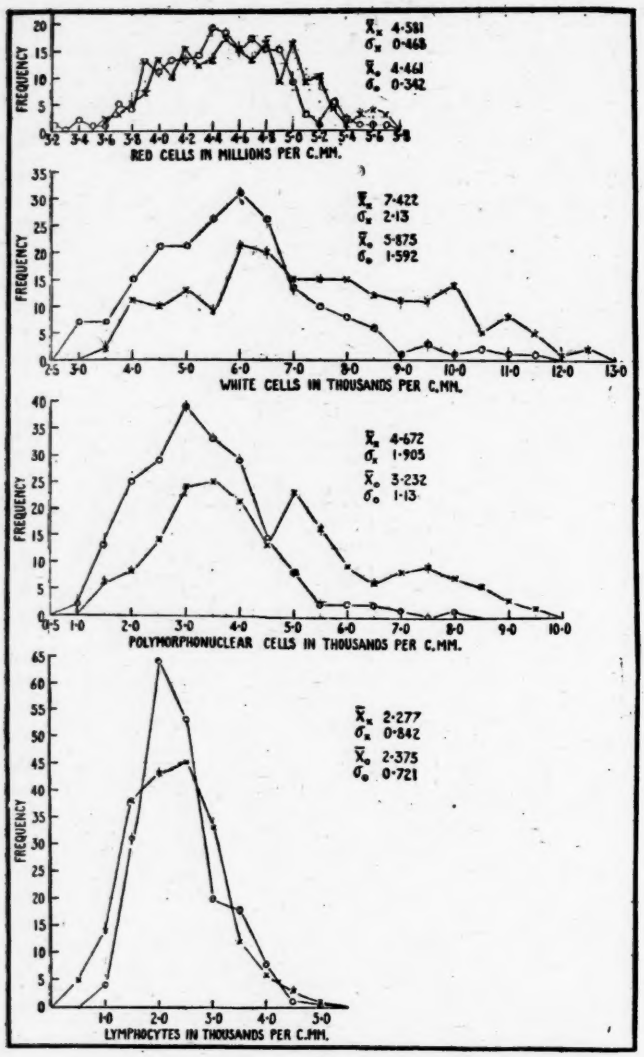
FREQUENCY
RED CELLS IN MILLIONS PER C.MM.
WHITE CELLS IN THOUSANDS PER C.MM.
POLYMORPHONUCLEAR CELLS IN THOUSANDS PER C.MM.
LYMPHOCYTES IN THOUSANDS PER C.MM.

Chart showing frequency distribution curves of red cells, white cells, polymorphs, and lymphocytes in the control group (x———x) and the group exposed to fumes of rubber solution (o———o).

distribution curves of the red cells, white cells, polymorphs, and lymphocytes are shown. It was impossible to treat the haemoglobin results in a similar manner, because the method of determining these varied with the conditions obtaining in the different localities where the investigation was pursued, and the methods employed did not all have the same degree of accuracy. This, with the possible variations in the standards used, introduces a degree of error which would render statistical analysis valueless. The differential counts were calculated on a basis of 200 cells where there was no deviation from the normal; 400 were counted in any doubtful case.

In the Chart the mean and its standard deviation for each set of observations are recorded, and from these the probable significance of the difference between means of the red cells, white cells, polymorphs, and lymphocytes of controls and rubber-solution workers can be calculated. If the difference between the means is greater than twice its standard error, then the difference is significant, and the chances are 19 to 1 against such frequency distribution curves being obtained from the same population of cells by random sampling—i.e., if $\bar{X}_x - \bar{X}_o > 2\sqrt{\frac{\sigma_x^2}{N_x} + \frac{\sigma_o^2}{N_o}}$ the difference is significant, where $\bar{X}_x$ and $\bar{X}_o$ are the means, σ_x and σ_o their standard deviations, and N_x and N_o the numbers of observations in the samples. The daily variations in the various elements of the blood count introduce a possible source of error into comparisons of this kind, but so far as is possible this has been corrected by taking the counts at the same time of day. However, to allow for this and other errors arising from dilution and counting, we decided not to call a difference between means significant unless it was more than 5 times the standard error of the difference.

The results of these comparisons are shown in Table I, from which it will be seen that significant decreases in the mean values of the total white counts and the polymorphonuclear cells (a decrease in

TABLE I.—*Comparison of Blood Counts of 200 Female Controls with those of 200 Females Working with Rubber Solution*

	Controls		Rubber-solution Workers		$\bar{X}_x - \bar{X}_o$	
	$\bar{X}_x$	x	$\bar{X}_o$		$\sqrt{\frac{\sigma_x^2}{N_x} + \frac{\sigma_o^2}{N_o}}$	
R.B.C.	4·581	0·468	4·461	0·342	2·9	Not significant
W.B.C.	7·422	2·130	5·875	1·592	8+	Significant
Polys.	4·672	1·905	3·232	1·130	9+	"
Lymphs.	2·277	0·842	2·375	0·721	1+	Not significant

polymorphonuclear leucocytes will hereafter be referred to as "neutropenia") are present in the women working with rubber solution. It will be seen that the standard deviation of the means is always larger in the control group, and this may be because the counts in this group were performed by several persons, whereas in the group being tested all the counts were done by one of us (E. B.). However, the final effect of this is to increase the value of the standard error of the difference between the means and thus decrease the ratio of the difference to the standard error; this will reduce the possibility of getting significant differences and not increase it. The monocytes, eosinophils, and basophils have not been included in this statistical comparison because their numbers are relatively small. Eosinophilia is, however, a recognized feature of the syndrome of severe chronic benzene poisoning.

In considering the individual cases of the test group the following scheme was followed in judging whether the woman should be considered as a possible case of benzene intoxication (Hamilton-Paterson, 1941). A plus sign was given for any of the following abnormalities: Hb below 80% Haldane or its equivalent, with either a macrocytic or microcytic anaemia; white cells below 5,500 per c.mm.; polymorphs below 3,000 per c.mm.; eosinophils more than 160 per c.mm., with a white cell count less than 5,500 per c.mm.—suggestive symptoms. The presence of three plus signs is suggestive of benzene poisoning, and that of four or more plus values diagnostic in the absence of any obvious causation other than exposure to benzene.

Benzene absorption may of course be present with only one or two plus values, but true benzene poisoning in such a case is rare and is usually accompanied by well-marked clinical signs. The analysis showed that 34 women (17%) were possible cases of benzene poisoning, and that 19 women (9.5%) had four or more plus values and were probable cases; a total of 53 out of 200 (26.5%). The frequency with which the abnormalities occurred in these cases was: neutropenia 50 times, leucopenia 44 times, anaemia 41 times, suggestive symptoms 27 times, and eosinophilia 15 times.

In the second part of the investigation all the women in one factory working with rubber solutions were tested and compared with women in the same factory who had never been in contact with such solutions. In all, 92 subjects were tested—62 contacts and 30 controls. Blood counts on the contacts were done after six months' work with rubber solutions, and those who showed changes suggestive of severe benzene absorption were removed to another part of the factory, where they had no contact with the solutions. After such a "rest" period of three months they again had blood counts to see what improvement, if any, had occurred.

The results are shown in Table II. The numbers involved were too small to compare statistically; averages have therefore been taken and the maxima and minima in each group recorded. It will be seen that the results for the 30 control women agree quite well with the 200 controls in the first part of the investigation. Also, the averages for the 62 contacts are similar to those for the 200 contacts already recorded, except for the red cell count, which is higher than in the control group. The variations in the control and contact groups, as estimated by the maxima and minima, are of the same order. The results in this factory therefore agree well with those of the random samples from the larger number of factories, and conversely, they suggest that the samples from the other factories closely represent the state of each factory as a whole.

Of the contacts 18 were removed and "rested" because of abnormalities of the blood counts. The averages of this group are shown in Table II, and also their averages at the end of the three months rest period. The difference is striking: the white cell count has increased from 3,680 per c.mm. to 6,140 per c.mm., and the polymorphs from 1,750 per c.mm. to 3,410 per c.mm. The counts

from showing a gross leucopenia and neutropenia, have returned to within normal limits. These results, indicating recovery from the depressive effect of benzene on the leucopoietic system, are closely comparable with those observed (e.g., Goodfellow, 1935) in radium and x-ray workers. To enhance the value of this observation three

TABLE II

	Hb	R.B.C.	W.B.C.	P c.mm.	P %	L c.mm.	L %	M c.mm.	M %	E c.mm.	E %	B c.mm.	B %
30 female workers not in contact with rubber solution													
Aver.	88·3	4·50	7,500	4,440	59·5	2,600	34·3	343	4·5	103	1·5	18	0·2
Max.	106	5·50	12,400	8,920		4,450		1,060		330		116	
Min.	78	3·73	3,100	1,540		990		31		0		0	
62 females after 6 months' work with rubber solution													
Aver.	90·7	4·71	5,400	3,100	56·25	1,900	36	290	5·45	102	2·1	4	0·2
Max.	112	5·64	10,700	6,950		4,620		1,000		448		62	
Min.	78	3·75	3,100	1,120		750		48		0		0	
18 females with blood change suggestive of marrow hypoplasia, after 6 months' work with rubber solution													
Aver.	86	4·54	3,680	1,750	47·7	1,630	44·2	202	5·5	73·5	2·1	18·5	0·5
Max.	104	5·92	4,800	2,740		2,310		360		192		40	
Min.	64	3·73	3,000	1,120		1,180		48		0		0	
The same 18 females after 3 months' rest away from rubber solution													
Aver.	86·3	4·61	6,140	3,410	55·5	2,360	38·4	276	4·5	92	1·5	6	0·1
Max.	100	5·49	8,100	5,750		3,900		576		300		132	
Min.	74	3·86	4,000	1,580		1,340		100		0		0	
3 females showing improvement of count with rest, and deterioration on further contact with rubber solution													
Case 1 6/12 contact	88	4·16	4,200	1,680	40	2,310	55	168	4	42	1	0	0
3/12 rest	85	4·49	7,400	4,440	60	2,520	34	296	4	74	1	0	0
4/12 contact	88	4·4	4,100	1,480	36	2,540	62	492	12	0	0	0	0
Case 2 6/12 contact	104	5·0	4,000	1,680	42	1,840	46	320	8	120	3	40	1
1/12 rest	90	4·47	3,800		38		48		11		3		0
4/12 rest	88	4·2	8,100	5,180	64	2,590	32	243	3	81	1	0	0
1/12 contact	86	4·3	5,500		40		52		4		4		0
4/12 contact	88	4·4	4,500	1,800	40	2,610	58	90	2	0	0	0	0
Case 3 6/12 contact	90	4·81	4,400	2,640	60	1,450	33	308	7	0	0	0	0
2/12 rest	86	4·80	6,700	3,220	48	3,020	45	400	6	67	1	0	0
2/12 contact	82	3·92	4,100	2,050	50	1,600	39	370	9	82	2	0	0

of these women were put back on to the benzene process and again examined in two to four months' time. Their counts are shown in the lower part of Table II, and require but little comment. In each case further contact with rubber solution has led to deterioration of the count.

Urinary Sulphates

It has been suggested (Yant *et al.*, 1936) that the determination of the ratio of inorganic to organic sulphate in the urine would be useful in discovering early cases of benzene poisoning. Of the absorbed benzene 90% is excreted in the lungs (Feil, 1933). The remaining 10% is oxidized in the body, conjugated with sulphates in the liver, and excreted in the urine, thus lowering the inorganic/organic urinary sulphate ratio. The lowest normal ratio is about 80/20 (Schrenk *et al.*, 1936; Kammer *et al.*, 1938). Yant *et al.* (1936) state that a decrease in inorganic sulphate in the urine is a constant and early sign of benzene poisoning in animals. A distinct decrease occurred even with conditions of exposure which did not produce anaemia or leucopenia. They suggest that the striking nature and reliability of the change in animals exposed to benzene should serve as a measure of the exposure and potentially harmful conditions in workers, before injury to the organism has occurred. It is emphasized that the changes are merely indicative of exposure and not of poisoning or damage.

Seventeen women with neutropenia, in the factory which was completely surveyed, submitted specimens of urine. The sulphates were estimated by the method of Peters and van Slyke (1932). All the results were within normal limits: the lowest ratio recorded was 81/19; all the rest were 85/15 or over. Twenty controls similarly examined gave readings ranging between 82/18 and 97/3.

These results would suggest that Yant's findings in animals cannot be applied to man, since in the series recorded here neutropenia certainly preceded urinary changes. In well-marked cases of chronic benzene poisoning the test is useful for confirming the diagnosis, as the inorganic sulphate may fall to below 50% of the total.

Discussion

As has been shown in the analysis of the results, the most striking changes in the blood counts are the leucopenia and the neutropenia. These are, of course, well known as the most common changes in the syndrome we call chronic benzene poisoning, before the development of the classical picture of aplastic anaemia, but it can be shown that they may occur in workers who show no clinical abnormality. Out of the 200 women exposed to rubber solutions and examined, 167 (83.5%) had white counts below the mean of 7,422 per c.mm. for the control group; 50.5% of the controls were below this mean. These figures are calculated from the frequency distribution curves (see Chart), and indicate that 33% of the test series have abnormally low white cell counts: 184 (92%) had lower polymorphs than the normal mean of 4,672 per c.mm., 55.5% of the controls being below the mean. Here 36.5% of the test series show an abnormally low polymorph count. In the analysis previously made 53 women (26.5%) of the test series were shown to be either suspicious or definite cases of severe benzene absorption; 44 of the series (22%) were suffering from leucopenia, and 50 (25%) had abnormally low polymorph counts. Thus it is clear that the white cell count has been lowered in 11% and the polymorph count in 11.5% of the test series where there was no indication of benzene poisoning.

It seems obvious, therefore, that there is a definite change in the white cell and polymorph counts before the appearance of other criteria which make a diagnosis of benzene absorption possible. The leucopenia and the low polymorph count run hand-in-hand—33% abnormality in the former and 36.5% in the latter; that is, the leucopenia is directly due to a reduction in the number of polymorphs. This is confirmed by the observation that there is no significant difference in the mean number of lymphocytes in either the test or the control group. The primary change is therefore the reduction in the number of polymorphs. This reduction is reflected in the bone marrow in a case reported by Piney and Hamilton-Paterson (1943) in which the myelogram showed a reduced percentage of myelocytes and metamyelocytes. To sum up, we may say that the essential change recorded in the test group of women is a neutropenia and that this makes its appearance before there is enough evidence to justify a diagnosis of benzene poisoning.

We have already shown that there is no significant difference between the means of the red cell counts of the exposed and control groups. On the other hand, 41 (20.5%) of the women picked out as possible cases of benzene poisoning showed anaemia—i.e., haemoglobin less than 80% and a colour index outside the limits of 0.85 to 1.10. The probable explanation of this anomaly is the different methods of haemoglobin estimation used—e.g., Haldane, Sahli, an alkaline haematin method (Clegg and King, 1942), and, on some occasions when no other was available, Tallqvist papers. It is possible that many of the results obtained by the last method were unreliable and may have caused us to mark a case as anaemic when in fact no such anaemia existed. It was because of this possible source of error that no attempt was made to compare the haemoglobin results statistically. In severe benzene poisoning, anaemia—either macrocytic and hyperchromic or microcytic and hypochromic—may develop, but the results of this investigation do not suggest that anaemia in any form is a constant early feature of the malady. Iron-deficiency anaemias may be difficult to distinguish from benzene anaemia because they may show a low white count with an abnormally low polymorph count; but administration of iron will probably separate them, because the few cases of benzene anaemia which we have been able to treat in this way have shown no improvement in the haemoglobin percentage and no reticulocytosis.

Eosinophilia has been stressed by some authors, particularly Dimmel (1932–3), as a feature of benzene intoxication. In the present series 18% of the exposed workers and 16% of the controls had more than 160 eosinophils per c.mm., while of the 53 affected workers 14 (26%) showed a similar change. Whitby and Britton (1942) give the normal maximum for eosinophils as 400 per c.mm. This may be so with a relatively high white count; with a white count of less than 5,500 per c.mm. 160 eosinophils should be regarded as the maximum.

Since this investigation has shown neutropenia to be the characteristic change found in early absorption of benzene, an examination of the incidence of neutropenia in the cases showing suspicious symptoms has been made. It may be stated at once that no such consistent relationship exists. Twenty-six (36%) of the 72 women presenting symptoms and 39 (37%) of the 104 symptom-free women had polymorphonuclear counts below 3,000 per c.mm.; that is, neutropenia occurs as often in women without symptoms as in those with them. Again, while three of the lowest polymorph counts recorded (1,600, 1,790, and 1,850 per c.mm.) occurred in three women complaining of more than one symptom—e.g., headache, dizziness, and nausea—even lower values (1,380 and 1,440 per c.mm.) were found in women with no apparent disturbance of health.

Menorrhagia has often been stated to be a leading symptom in chronic benzene poisoning. Eight cases occurred in this investigation, and seven of these were in women between the ages of 40 and 55. Is this menorrhagia due to benzene or to the menopause? As most of the cases occur between the ages of 40 and 55 it would appear at first sight as if the symptom was menopausal; it may be, however, that women at the menopause are more susceptible to benzene poisoning. Menorrhagia, in the absence of malignancy or endometrial abnormality, is a rare complication of the climacteric (Hamblen, 1939). We found 7 out of 43 women (16.2%) of the appropriate age group to be suffering from menorrhagia. This figure of incidence is higher than one would expect from a rare complication, but, as no attempt was made to exclude local disease of the uterus as a cause of the menorrhagia, it cannot be said definitely to be the result of increased susceptibility to benzene; it may, however, be suggestive. It should also be noted that the average polymorph count in these women (3,059 per c.mm.) is lower than in the younger women (3,603 per c.mm.).

There is no agreement in the literature about the subjective symptomatology of the climacteric. Norris (1919) states that 90% of healthy women experience no severe symptomatic disturbance; Hawkinson (1938), however, expressly states that 75% of all women suffer from distressing symptoms during this period. The personal factor is of course difficult to assess. Twenty-four of the 43 women examined (55.8%) complained of one or more of the following symptoms—lassitude, headache, giddiness, and menorrhagia—any of which may have been due to the climacteric or to the absorption of benzene. As this figure falls nicely between the two quoted, it cannot be said to indicate that benzene workers show more disturbance during the menopausal period.

The length of exposure to the fumes of rubber solution ought to be related directly to the neutropenia which has been shown to develop—that is, the longer the exposure the more marked should be the resulting fall in the polymorph count. An attempt was made to demonstrate this with the figures at our disposal, but it appeared that 59% of the women had been exposed for one year or less, and only 13% for a period between 2½ and 3 years. The average polymorph counts for these two groups were 3,163 per c.mm. and 3,445 per c.mm. respectively. As this last figure was calculated from only 26 women it is impossible to say that it presents a true picture of the whole population so employed. If, for argument's sake, it is assumed that the length of exposure does not increase the neutropenia, and therefore does not increase the risk to the worker, it would still have to be shown that the polymorphonuclear count returned to normal with rest after three years' exposure as well as after one year's exposure. Unfortunately all our figures for recovery were obtained on women with only six months' exposure, and at the moment none are available in respect of those with longer exposure.

The figures in the second part of the investigation, dealing with the changes in the blood counts after removal from exposure to the solution, speak for themselves. After periods of rest up to three months the polymorph and white cell counts have risen and lie within normal limits. In the three women who were again exposed the counts very soon dropped. This observation, taken in conjunction with the previous observation that a lowering of the polymorph count is the earliest and most constant indication of benzene absorption, immediately suggests a method of controlling the absorption—particularly since, as already shown, there is no relation between symptoms and neutropenia. We would suggest that white cell counts should be done on all workers after an initial exposure of, say, six months: and that any who show neutropenia should be transferred to other work and recounts made after two months. If the count is then within normal limits the woman can be put back on her original work for a further period of six months and then be retested. If, however, there is no improvement in the count after the "rest" period the affected woman should be advised to give up work with benzene altogether, as it is possible that her bone marrow may be permanently depressed.

Conclusion

The toxic effects of the aromatic hydrocarbons (chiefly benzene) used in rubber solutions make the above precautions highly desirable. The substitution of a relatively non-toxic solvent such as solvent naphtha would render haematological control of the worker unnecessary; but so long as benzene is used it is advisable that the persons exposed should be given the protection of routine blood examinations. It may be noted that as the result of representations by the Factory Department the aromatic content of the rubber solutions used in this process has been limited to not more than 5% as one of the preventive measures required.

The question as to how the women with lowered polymorph counts react to infection is obviously important, and is one which we have not enough data as yet to answer. If the injury to the bone marrow is such that it does not recover with rest, it may be that infection will also be an insufficient stimulus to leucocytosis, and the patient thereby be deprived of an important defence mechanism.

The excretion of increased amounts of organic sulphates in the urine is a feature of severe benzene poisoning, but in this investigation no definite changes were found in people who clinically and haematologically showed definite early signs of the malady. It would seem, on the basis of this study, that benzene will produce haematological changes before it is excreted in significant amounts.

Summary

The clinical and haematological pictures of 200 women working with industrial rubber solutions are compared with 200 control women. Neutropenia is shown to be the commonest and earliest sign of benzene absorption.

It has been shown that there is no correlation between the symptoms complained of and the onset of haematological changes. This is important because clinical examinations alone are probably useless for the specific detection of early cases; but of course they have great value in the diagnosis of cases of deterioration in health due to other causes.

A possible method of preventing the onset of chronic benzene poisoning by regular white cell counts and suitable periods of "rest" is suggested.

REFERENCES

Clegg, J. W., and King, E. J. (1942). *British Medical Journal*, **2**, 329.
Dimmel, H. (1932–3). *Arch. Gewerbepath. Gewerbehyg.*, **4**, 414.
Feil, A. (1933). *Presse méd.*, **41**, 129.
Goodfellow, D. R. (1935). *Brit. J. Radiol.*, **8**, 752.
Hamblen, E. C. (1939). *Endocrine Gynaecology*, p. 187, Springfield, Ill., and London.
Hamilton, A. (1925). *Industrial Poisons in the United States*, New York.
Hamilton-Paterson, J. L. (1941). *Lancet*, **1**, 73.
Hawkinson, L. F. (1938). *J. Amer. med. Ass.*, **111**, 390.
Kammer, A. G., Isenberg, N., and Berg, M. E. (1938). Ibid., **111**, 1452.
Kobert, R. (1906). *Lehrbuch der Intoxikationen*, **2**, 926, Stuttgart.
Meda, G. (1922). *Med. Lavoro*, **13**, 264. Quoted by Browning, E.: *Toxicity of Industrial Solvents*, H.M. Stationery Office, London, 1937.
Norris, C. C. (1919). *Amer. J. Obstet. Gynec.*, **79**, 767.
Peters, J. P., and van Slyke, D. D. (1932). *Quantitative Clinical Chemistry*, **2**, 892, Baltimore and London.
Piney, A., and Hamilton-Paterson, J. L. (1943). *Sternal Puncture*, 2nd ed., London.
Schrenk, H. H., Yant, W. P., and Sayers, R. R. (1936). *J. Amer. med. Ass.*, **107**, 849.
Smith, A. R. (1928). *J. industr. Hyg.*, **10**, 73.
Whitby, L. E. H., and Britton, C. J. C. (1942). *Disorders of the Blood*, 4th ed., London.
Yant, W. P., Schrenk, H. H., Sayers, R. R., Horvarth, A. A., and Reinhart, W. H. (1936). *J. industr. Hyg.*, **18**, 69.

THE SULPHONAMIDES IN OPHTHALMIA NEONATORUM

BY

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AND

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In an earlier communication (Sorsby, Hoffa, and Smellie, 1942) an account was given of the value of the administration of sulphapyridine in 273 cases of ophthalmia neonatorum treated at White Oak Hospital from towards the end of 1939 till Dec. 31, 1941. By comparison with 46 cases treated by the classical local methods, it was concluded that the results obtained with sulphapyridine justified the description of the new method of treatment as a revolutionary advance and that the classical methods of local therapy no longer had any place in the treatment of ophthalmia neonatorum. It was also shown that sulphapyridine proved as effective in non-gonococcal ophthalmia as in the gonococcal variety. The present paper deals with a further 258 cases (out of a total of 269) seen between Jan. 1, 1942, and Dec. 31, 1943. Of the 258 cases, 133 were treated with sulphapyridine, 43 with sulphathiazole, 28 with sulphamezathine, 31 with sulphadiazine, and in the residual group of 23 more than one of these sulphonamides were used as the cases proved resistant or intolerant to the drug employed initially. The results of treatment are set out in the following table.

to it, is apt to be more selective in effect. Sulphapyridine is probably the least satisfactory owing to its greater tendency towards toxic manifestations; for the present, at any rate, its use as the routine drug has been discontinued.

Though the present series shows more favourable results than the previous one with its many early cases treated before a definite routine had been established, it is of some interest to summarize the findings in these two series, comprising together 531 cases (Table II).

TABLE II.—*Results in 531 Cases of Ophthalmia Neonatorum treated by Sulphonamides (273 Cases published earlier and 258 in the Present Series) contrasted with the previously published 46 Control Cases treated locally by the Classical Methods*

Clinical Cure	Local Treatment (Classical Methods)			General Sulphonamide Treatment		
	Gonococci-positive	Gonococci-negative	Total	Gonococci-positive	Gonococci-negative	Total
Well in 8 days ..	2	5	7 (15·2%)	97 (73·0%)	293 (73·6%)	390 (73·4%)
,, 9 to 30 days	6	21	27 (58·7%)	26 (19·5%)	96 (24·1%)	122 (23·0%)
,, more than 30 days	7	5	12 (26·1%)	10 (7.5%)	9 (2·3%)	19 (3·6%)
Totals ..	15	31	46	133	398	531

Gonococcal and Non-gonococcal Cases

In the previous series the incidence of gonococcal infection was 27.3% (89 cases in a consecutive series of 322). In the total present series of 269 cases it constituted 23.8% (64 cases).

TABLE I.—*Comparative Results of Some Sulphonamides in Ophthalmia Neonatorum*

Clinical Cure	Sulphapyridine			Sulphathiazole			Sulphamezathine)			Sulphadiazine			Two or More of these Four			Total		
	Gonococci-positive	Gonococci-negative	Total	Gonococci-positive	Gonococci-negative	Total	Gonococci-positive	Gonococci-negative	Total	Gonococci-positive	Gonococci-negative	Total	Gonococci-positive	Gonococci-negative	Total	Gonococci-positive	Gonococci-negative	Total
1 to 3 days	15 (48·5%)	26 (25·5%)	41 (30·8%)	7	7	14 (32·5%)	3	8	11 (39·3%)	5	5	10 (32·3%)	1	—	1 (4·3%)	31 (51·7%)	46 (23·2%)	77 (29·9%)
4 ,, 8 ,,	13 (41·9%)	64 (62·7%)	77 (57·9%)	4	22	26 (60·5%)	2	13	15 (53·6%)	4	12	16 (51·6%)	—	10	10 (43·6%)	23 (38·3%)	121 (61·1%)	144 (55·8%)
9 ,, 30 ,,	3 (9·6%)	12 (11·8%)	15 (11·3%)	—	3	3 (7.0%)	—	2	2 (7·1%)	—	5	5 (16·1%)	2	7	9 (39·1%)	5 (8·3%)	29 (14·6%)	*34 (13·2%)
Over 30 ,,	—	—	—	—	—	—	—	—	—	—	—		1	2	3 (13·0%)	1 (1·7%)	2 (1·0%)	*3 (1·1%)
Totals ..	31	102	133	11	32	43	5	23	28	9	22	31	4	19	23	60	198	258

* Including relapses after an apparent clinical cure.

This table confirms the earlier findings as to the efficacy of sulphapyridine both in gonococcal and in non-gonococcal ophthalmia. As was indicated in the earlier study, the results there recorded had to be regarded as an understatement of the value of this drug, for many of the earlier cases received a dosage that later on was recognized as less than the optimum. For this reason it is possible to classify the present data, collected on the basis of uniform dosage, rather more finely than the earlier series: the clinical cures obtained within 8 days are now shown as those achieved within 1 to 3 days and those taking 4 to 8 days. It will be seen from Table I that 85.7% were cured within 8 days (as against 61.9% in the earlier series) and that no fewer than 29.9% were cured within 3 days.

Relative Value of the Different Sulphonamides

As to the relative value of the various sulphonamides, the only substantial study on the subject has come from Wong (1942), who found that on the average sulphanilamide effected a cure in 7.2 days in 20 cases of gonorrhoeal ophthalmia, while sulphapyridine was effective in 4.8 days in 10 cases and sulphathiazole in 3.4 days in a further series of 10 cases. The results recorded here do not cover a sufficiently large number of cases to allow fine distinctions to be drawn. However, it does not appear that any one of the four sulphonamides studied gives strikingly different end-results. Sulphadiazine has the advantage of being the best-tolerated of these four drugs, and sulphamezathine is probably as good. It is possible—but this requires confirmation—that sulphathiazole, while gratifyingly effective in such cases as respond

The ophthalmia was confined to one eye in 89 instances, or 33.0%—a close approximation to the incidence of 30.5% observed in the previous series. The difference in unilateral incidence as between gonococcal and non-gonococcal ophthalmia is not great, being 28.1% (18 out of 64 cases) in gonococcal ophthalmia and 34.1% (70 out of 205 cases) in non-gonococcal ophthalmia.

The present evidence suggests that, while the sulphonamides are effective in non-gonococcal ophthalmia as well as in ophthalmia due to the gonococcus, rather quicker cures are obtained in the gonococcal variety. Cures within 3 days were obtained in 51.7% of gonococcal cases, against 23.2% in non-gonococcal cases (in 31 out of 60 cases and in 46 out of 198 cases respectively). In both groups the bulk of cases did not require treatment beyond 8 days, 90.0% of all gonococcal cases and 84.3% of all non-gonococcal cases, which included organismal, non-organismal, and the inclusion varieties of ophthalmia neonatorum, having become resolved by that time.

Delay in Initiating Treatment, and Protracted Cases

As in the earlier series, delay in starting sulphonamide therapy did not affect its efficacy: 85 cases first received sulphonamide treatment after the infection had been established for more than 8 days; these cases responded as well as the 173 less-established infections did. Seven cases had corneal ulcers (all unilateral) on admission. They all cleared quickly and well, leaving hardly perceptible or no scars, and in no case did a corneal ulcer develop while treatment was being given, though a number of infants had hazy cornea on admission.

In cases that take longer than 8 days for cure sulphonamide treatment is generally not needed, as the affection is no longer one of purulent ophthalmia but of a rather resistant conjunctivitis with some muco-pus. The proper treatment of such cases is still a matter of doubt; some, at any rate, are best left alone. In one case (non-gonorrhoeal) profuse purulent discharge continued for nearly a month in spite of intensive treatment with the various sulphonamides. In another, also non-gonococcal, a false membrane formed on the palpebral conjunctiva of the two lids of one eye, and is disappearing only now, three months later; all active treatment was suspended at the end of the first month, and at no time was there any apparent danger to the cornea.

Few relapses have been seen in the present series, and this is perhaps due to the greater initial dosage (0.25 g.) and maintenance dosages of 0.125 g. four-hourly, not only during the active phase of the affection but for three days after apparent clinical cure. Apart from minor toxic effects no untoward results were observed.

Causal Organisms

The 198 non-gonococcal cases in the present sulphonamide series included 50 in which pus cells only, but no organisms, were found, 52 with various bacilli (mostly diphtheroids), 88 with staphylococci, and 8 with other coccal organisms. Inclusion bodies were found 27 times; they occurred twice in association with organisms and 25 times in cases in which no organisms could be found. The actual distribution of the various organisms in this series, taken together with the 11 cases not treated by sulphonamides (but by newer methods of local therapy), is shown in Table III, which includes comparative figures from the previous series.

TABLE III.—*Differential Incidence of Organisms in 269 Consecutive Cases of Ophthalmia Neonatorum treated in the Period Jan. 1 1942, to Dec. 31, 1943, with Comparative Findings for 322 Cases seen during Sept., 1939, to Dec., 1941*

	Sept., '39, to Dec., '41		Jan., '42, to Dec., '43		Total
No organism found in smear or culture	53		51		104
Gonococcus	89		64		153
Staphylococcus:					
Staphylococci	56	111	48	92	203
,, and diphtheroids	25		20		
Staphylococcus albus	17		13		
,, aureus	13		11		
Other coccal organisms:					
Gram-positive cocci	6	20	1	9	29
Meningococci	4		2		
Pneumococci	3		2		
Streptococcus haemolyticus	2		3		
,, viridans	1		—		
Micrococcus catarrhalis	2		—		
,, tetragenus	2		1		
Bacilli:					
Diphtheroids	20	49	31	53	102
Koch-Weeks	8		2		
Coliform	6		2		
Gram-positive	3		1		
Gram-negative	3		10		
Xerosis	3		—		
Morax-Axenfeld	3		3		
Hoffmann	2		—		
Friedländer	1		4		
Total	322		269*		591

* Inclusion bodies found 27 times: twice in association with organisms and 25 times without organisms.

Summary

In the earlier series of 273 cases of ophthalmia neonatorum treated by the oral administration of sulphapyridine, 61.9% showed clinical cure within 8 days.

In the present series, in which a standard dosage was used in 258 cases, 133 were treated with sulphapyridine, 43 with sulphathiazole, 28 with sulphamezathine, and 31 with sulphadiazine; two or more sulphonamides were used in the remaining 23 cases, which were either resistant or intolerant to the sulphonamide used initially. In these 258 cases clinical cure was obtained within 8 days in 85.7%.

A high proportion of cases (29.9%) showed clinical cure within 3 days; 55.8% required from 4 to 8 days for clinical cure; and 14.3% showed a protracted course.

There was no appreciable difference in the action of the four sulphonamides used. Clinical cures within 8 days were obtained in 88.7% of cases treated with sulphapyridine, 93.0% of those treated with sulphathiazole, 92.9% of sulphamezathine cases, and 83.9% of sulphadiazine cases. Sulphapyridine, because of its greater toxicity, appears to be the least desirable of these sulphonamides.

Gonococcal cases responded more rapidly to sulphonamide therapy than did the non-gonococcal cases; 51.7% of the 60 gonococcal cases showed clinical cure within 3 days, against 23.2% of the non-gonococcal cases. By the end of 8 days 90.0% of all gonococcal cases and 84.3% of non-gonococcal cases were clear.

In the present series inclusion bodies were found in 27 instances: twice in association with organisms and 25 times without such association. These cases responded well to sulphonamide therapy.

Only exceptionally is a case completely resistant to sulphonamide therapy. It is more a matter of sluggish response than of total resistance.

The routine at White Oak Hospital now includes administration of the sulphonamides for 3 days after clinical cure; fewer relapses are now observed.

We are indebted to Dr. E. N. Young of the Southern Group (L.C.C.) Laboratories for her painstaking bacteriological examinations. We are also obliged to Dr. G. Heisler, and to the Matron and Sister Condon of White Oak Hospital, for their collaboration.

REFERENCES

Sorsby, A., Hoffa, E. L., and Smellie, E. W. (1942). *British Medical Journal*, **1**, 323.
Wong, R. T. (1942). *Arch. Ophthal.*, Chicago, **27**, 670.

THE BLOOD PRESSURE IN MIDWIFERY

BY

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A study of the blood pressure during the later months of pregnancy is a recognized part of adequate ante-natal care, yet often it is neglected as soon as labour begins. This is all the more surprising since the value of blood-pressure records has been well established on the operation table and in the prevention and treatment of traumatic shock, and the same influences—drugs, haemorrhage, and trauma—are present to some extent in most labours.

The literature on this subject is very scanty; the most useful articles in the English language are those by Cook and Briggs (1903), Bailey (1911), Donaldson (1913), Schwarz (1923), Simons and Rasmussen (1925), and Matthews (1939). The subject is also practically ignored, apart from mentioning the blood pressure in eclampsia and toxaemia, in all the recent textbooks on midwifery that I have seen.

I have made records of the blood pressure, both systolic and diastolic, in all my midwifery for over two years, and I find them very instructive in assessing the effects of management and treatment, especially analgesia and anaesthesia. The technique is simple, and well within the scope of the general practitioner, even when working alone. The chief difficulty arises when the doctor is distracted from the mother to attend to urgent foetal asphyxia, for it is at this time during the third stage of the labour that the most important changes in blood pressure take place. I firmly believe that if more attention were paid to the blood pressure incipient shock would be recognized earlier while still amenable to simple treatment, and the lives of many of our mothers would be saved.

Types of Blood-pressure Curve

The first problem to be solved is that of the normal—that is to say, the blood-pressure curve in a straightforward delivery uninfluenced in any way by drugs or obstetric manipulations. It has been stated by Halls Dally (1936) that "during labour there is a progressive elevation of blood pressure, even to considerable heights as the pains become more intense, reaching a maximum as the head of the infant is expelled. After delivery the pressure rapidly falls." In my experience this description is very misleading, and there is far less disturbance of blood pressure than one would suppose.

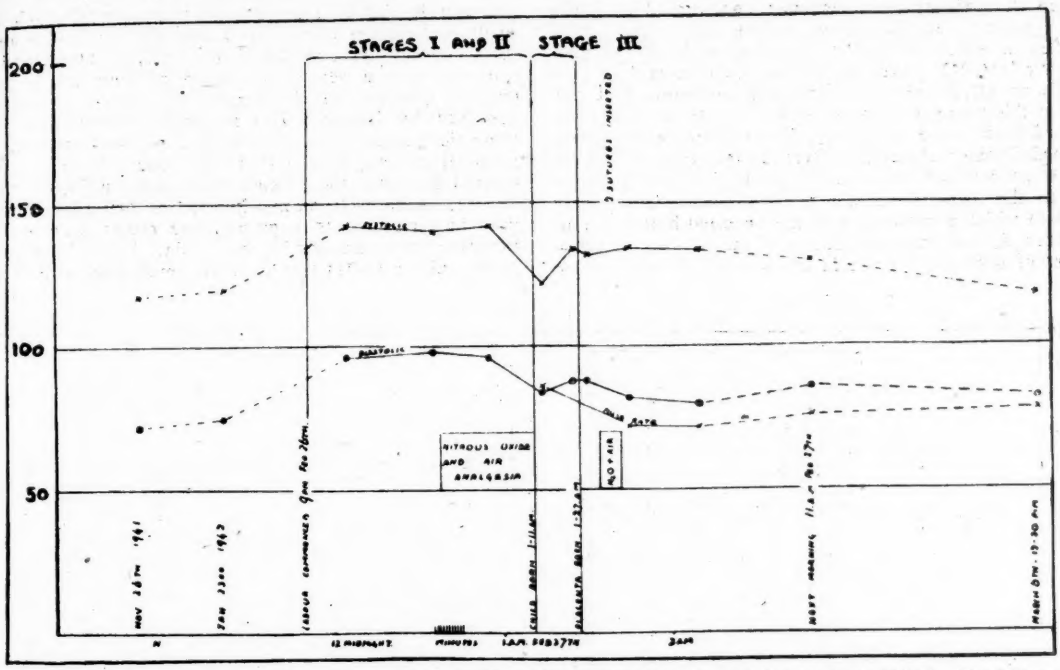
Graph A is a typical blood-pressure curve, and probably approximates to the normal, even though nitrous oxide analgesia was given towards the end of the second stage. Exactly similar curves are recorded when no form of analgesia is given, and also when the agent used is weak chloroform or trichlorethylene. It will be seen that in labour there is a rise of about 20 mm. Hg. followed by a short-lived fall after delivery, partly due to reduced pulse pressure, but also shown in the diastolic pressure as well. In this particular case the blood pressure as the head was being born was not recorded, but I have rarely found it much higher. Soon

after delivery the blood pressure rises again, and this coincides with the return of uterine contractions. After the first day there is a gradual fall during the puerperium, but Donaldson (1913) has pointed out that this fall is no more than one would expect to find in any patient who was confined to bed.

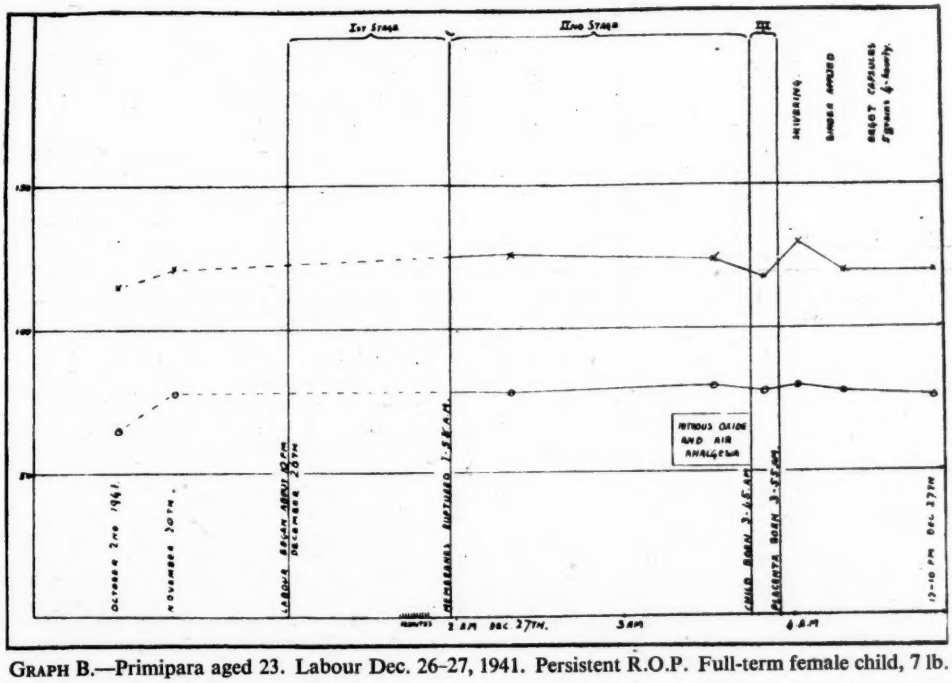
I have recorded not only the systolic pressure but also the diastolic, and no account has been taken of the rise in pressure during pains, the recorded figures being taken only between each contraction. Although it may not be strictly accurate, I have assumed for all practical purposes that the diastolic pressure is a measure of the peripheral resistance to the circulation, and therefore an index of the vasomotor tone, and that the systolic pressure represents the sum of this peripheral resistance plus the pulse pressure, representing cardiac output. In studying these records I would stress the value of the diastolic pressure, and point out that the systolic pressure alone tells us only part of the story.

Graph B is a second type of blood-pressure curve, and is nearly as common as the first example. In this type there is very little or no increase in the blood pressure during labour, and the fall after delivery is also negligible, but soon afterwards there is a sharp increase in the pulse pressure. In my experience such an increased pulse pressure soon after delivery invariably coincides with a sharp bout of shivering. This is an observation which, so far as I am aware, has not previously been made, but I think it is of considerable importance in explaining the changes which take place in the third stage of labour.

A theory has been handed down from the time of William Smellie that the sudden emptying of the uterus at birth tends to cause collapse. His pupil, John Harvie (1762), described it as "too great quantity of blood rushing into ye relaxed vessels of ye abdominal contents, whereby ye head is robbed of its due proportion, and dangerous faintings ensue." This phenomenon was thought comparable with the collapse which sometimes follows paracentesis abdominis. To it has been attributed not only obstetric shock but also the fall in systolic pressure (Cook and Briggs, 1903) and the shivering bout (Phillips, 1931). It is interesting to note that the splanchnic pool theory of shock has only recently been discarded. Bailey (1911) was the first to doubt the theory, and suggested that



GRAPH A.—Primipara aged 23. Labour Feb. 26–27, 1942. R.O.P. rotating spontaneously to R.O.A. Dry labour. No drugs given other than N_2O + air. Full-term male child, 6¼ lb.

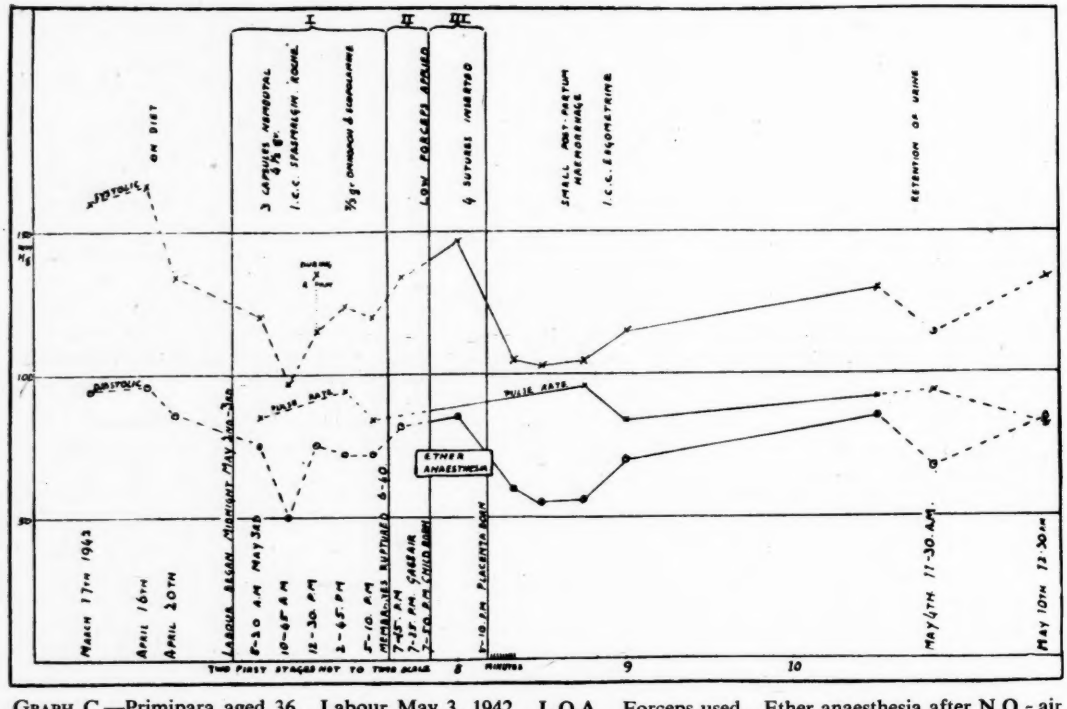


GRAPH B.—Primipara aged 23. Labour Dec. 26–27, 1941. Persistent R.O.P. Full-term female child, 7 lb.

the fall in systolic pressure seen after delivery might be due rather to an abrupt cessation of pain, anxiety, and muscular activity. The fact, unknown to him, that the drop is largely in the pulse pressure and that it also partially recovers when contractions begin again, supports his view. Soon afterwards Donaldson (1913) firmly rejected the whole idea on the good grounds that the splanchnic vessels have muscular fibres in their walls, and do not rely on the pressure of the abdominal viscera for their support. In other words, he recognized the presence of vasomotor tone. Clinical experience rejects also the idea of dangerous faintings, which we know are rare even when the patients have the most uncontrollable attacks of shivering. I suggest that the shivering bout is one symptom of a vasomotor reflex in which the skin vessels play a prominent part. Wiggers and Werle (1942) have pointed out that in such a skin reflex the salivary glands are included, and we know that our patients often at this time ask for a sip of water. Nevertheless there is an element of truth in the old theory, for in Graph A the fall in blood pressure definitely includes the diastolic pressure, and I would suggest that, while most of the drop in systolic pressure is due to the cessation of the pains, there is a temporary relaxation of the uterine sinuses in which a proportion of the maternal blood may be pooled until such time as the contractions of the third stage begin. This is a point of some importance in cases of atonic post-partum haemorrhage. It should be remembered that the uterine blood vessels during pregnancy lose their muscular coats and come to rely for their support at term on the muscle fibres of the uterus (DeLee, 1938).

The most dramatic changes in blood pressure are seen in complications of the third stage of labour. For example, Graph D is from a case of post-partum haemorrhage, and shows a rapid fall in the systolic pressure from over 130 mm. Hg to 88 mm., with a corresponding rise in the pulse rate. Yet in this case the diastolic pressure dropped only a few millimetres, showing that there was no vasomotor failure. As soon as the usual measures for controlling haemorrhage had been taken, recovery was steady and assured. Thus the effect of the haemorrhage as well as the effectiveness of the treatment can be seen in the blood-pressure curve.

Graph E affords a marked contrast, for although there was a small post-partum haemorrhage, the picture was completely overshadowed by shock, shown by faintness, giddiness, and a cold perspiration, and a very severe drop in both the systolic and the diastolic pressure to 80/60 mm. Hg, which is within the limits described by Hewer (1943) as critical hypotension. Fortunately energetic treatment brought about a prompt recovery. A point of practical importance arises in such cases; it will be seen that no attempt to repair the perineum was made until the blood pressure had been restored to normal limits, and then a local anaesthetic was used in preference to a general one rather than run any risk of upsetting the vasomotor balance again. It has been pointed out by Miles Phillips (1931) that even the small amount of trauma caused by the operation of perineal repair may be sufficient to take away the patient's chance of recovery.



GRAPH C.—Primipara aged 36. Labour May 3, 1942. L.O.A. Forceps used. Ether anaesthesia after N_2O - air analgesia. Full-term female child, 8¼ lb. Exceedingly fat patient: abdominal examination impossible.

A valuable clinical lesson which may be learnt from these records is the depressant effect of drugs used for analgesia and anaesthesia. The barbiturates are the worst offenders, and a drop of 20 mm. Hg, both systolic and diastolic, is commonly recorded after the normal doses. Graph C is an example of such a fall after the use of nembutal, and I have seen just the same after seconal. This graph, in addition, shows well the effect of prolonging ether anaesthesia, given in the first place for low forceps, through the third stage of labour to cover a small perineal repair operation. While it is well known that chloroform anaesthesia produces such hypotension, it is not always realized that ether does so too once the initial stimulant effect has passed off. The importance of hypotension under anaesthesia as a precursor of shock has recently been stressed in an article by Dodd and Prescott (1943). If such hypotension can be demonstrated in the mother, what must be the effect on the foetal circulation? Among the causes of foetal asphyxia anaesthetics and analgesic drugs administered to the mother play a very considerable part (Shaw, 1943). One is justified, I think, in assuming that any depression of the maternal circulation must be reflected in that of the foetus, at least up to the moment when independent respiration begins. Further research along these lines might lead to a reduction in the stillbirth rate.

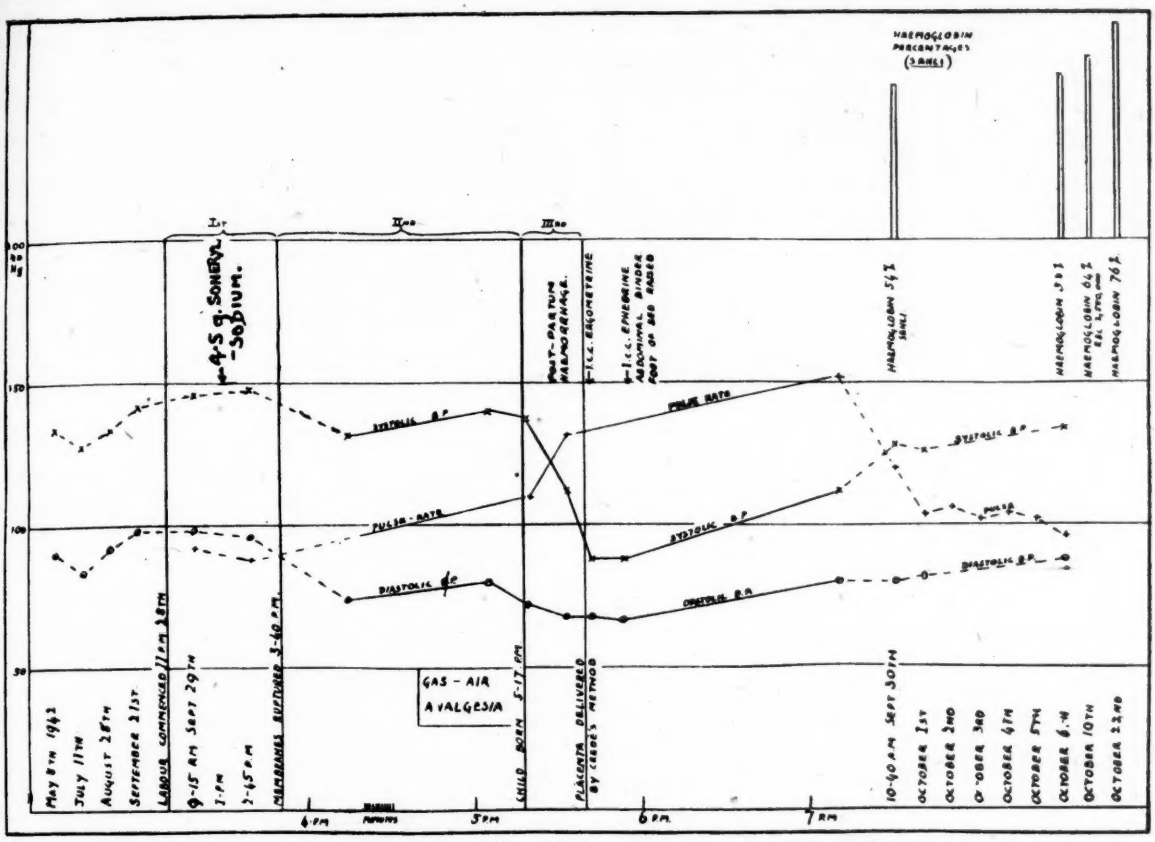
On Graph C I have noted the rise of systolic pressure produced by a first-stage uterine contraction. I have frequently noted down the blood-pressure changes produced by the pains, and generally have found an increase of from 18 to 25 mm. systolic and 8 to 18 mm. diastolic. I have never seen anything like the 50-mm. rise in the systolic pressure mentioned by Donaldson (1913), and think this must be very exceptional. It is not difficult to explain the systolic increase as the result of muscular exertion and physical pain (Cannon, 1929), but this will not account for the diastolic rise, which is not affected by them (McDowall, 1941). As I have already mentioned, the uterine sinuses are supported by the muscular fibres of the uterus and therefore the uterine circulation must be compressed with each contraction. It has been shown by Chassar Moir (1933–4) that this pressure is of the order of 50 mm. Hg during the first stage of labour, rising to about 85 mm. during the second stage. Since the normal diastolic pressure is between 70 and 80 mm. it follows that during each pain the uterine pressure would close these sinuses and stop the circulation if there were not an increased diastolic pressure to raise the mean blood pressure over this normal figure. It is possible that the increased diastolic pressure is brought about by an increased tone in the peripheral circulation in order to maintain a sufficient supply of blood to the contracted uterus.

Apart from example C, in which a mild degree of toxaemia before labour is shown to have responded rapidly to treatment, I have

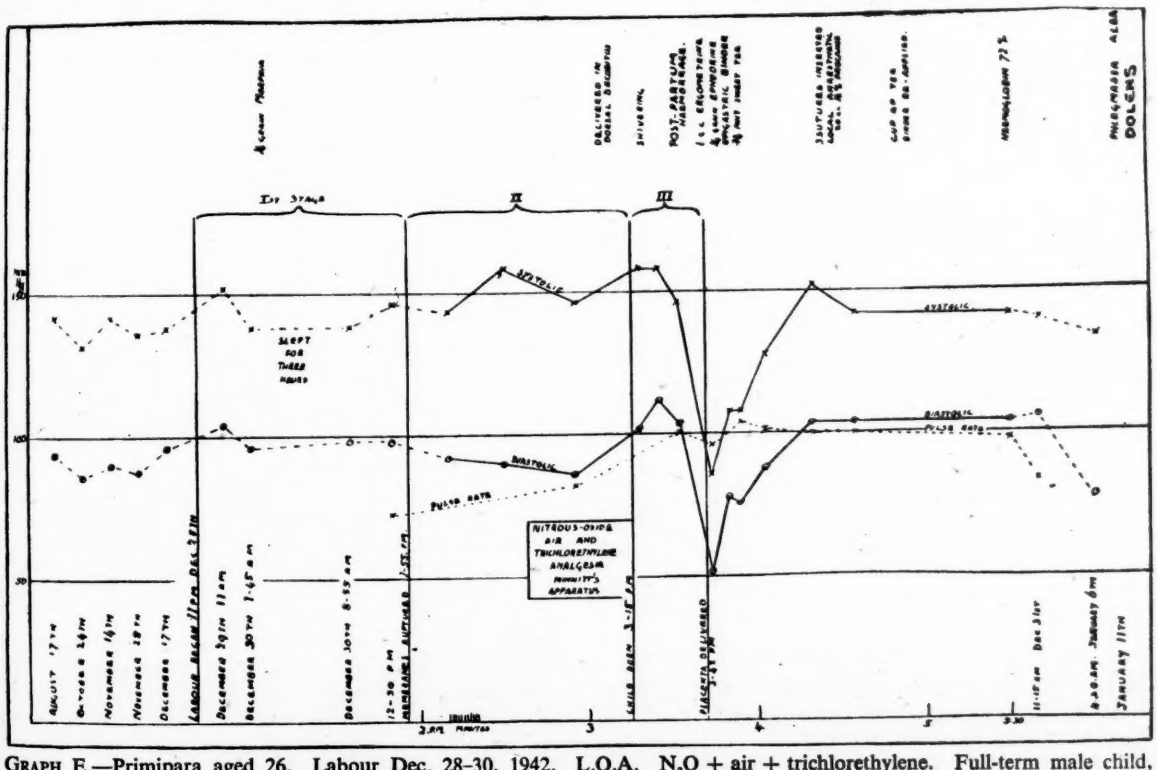
given no examples of the blood-pressure changes in toxic cases. I consider myself fortunate in not having seen an eclamptic fit in twelve years of practice. This aspect of the subject is fairly well covered in the literature, especially in papers by Hirst (1910), Bailey (1911), Bailey and Driscoll (1926), and Adair, Hunt, and Arnell (1936). The last-named authors have been so impressed by the grave danger of shock in toxic elderly multiparae that they have coined the very graphic expression "vascular collapse" for this association.

Conclusion

There are thus many practical lessons to be learnt even from my short series of about 40 cases. Obviously, since they produce such marked hypotension, the barbiturate drugs should be used only in the early stages of labour, and are best avoided within a short time of delivery. Also any hypotension which may be present during the third stage of labour is to be



GRAPH D.—Para-1 aged 34. Labour Sept. 28–29, 1942. L.O.A. Full-term male child, 7¼ lb. Post-partum haemorrhage.



GRAPH E.—Primipara aged 26. Labour Dec. 28–30, 1942. L.O.A. N_2O + air + trichlorethylene. Full-term male child, 6¾ lb. Small p.p.h. Later developed phlegmasia alba dolens.

regarded as a danger sign, and the blood pressure should be restored before anything else is done, the only exception to this rule being the minimum steps necessary to stop haemorrhage. It is not always appreciated that in cases of traumatic shock the precipitating injury precedes the secondary factors, such as pain, exhaustion, drug depression, and injudicious rough handling, which join in to complete the clinical picture; whereas in labour most of these factors will have been present for some hours before the final trauma which determines and initiates shock. The ultimate state of shock is the same, but the sequence is different. When, therefore, a long and difficult labour is anticipated we have a particularly favourable opportunity of controlling these accessory factors, especially if we study the blood pressure.

I would therefore urge the general practitioner to use his sphygmomanometer at the bedside in his midwifery, and cannot do better than quote in support of my plea the words of Prof. Miles Phillips (1936), who made it his practice to do so, although he has not published his figures. Speaking before an American Association of Surgeons, he said: "Neither she nor her husband was concerned with the maternal mortality rate—only four, five, or six in a thousand—but they did expect you to take every precaution."

May I record my thanks to Mr. Shields, librarian of the British Medical Association, for his indefatigable help in supplying me with the available references.

REFERENCES

Adair, F. L., Hunt, A. B., and Arnell, R. E. (1936). *J. Amer. med. Ass.*, **107**, 1036.
Bailey, H. C. (1911). *Amer. J. Obstet.*, **64**, 260.
—— and Driscoll, W. P. (1926). *Amer. J. Obstet. Gynec.*, **11**, 287.
Cannon, W. B. (1929). *Bodily Changes in Pain, Fear, Hunger and Rage*, New York.
Cook, H. W., and Briggs, J. B. (1903). *Johns Hopk. Hosp. Reps.*, **11**, 451.
Dally, J. F. Halls (1936). *Brit. Ency. med. Pract.*, **2**, 505, London.
DeLee, J. B. (1938). *Principles and Practice of Obstetrics*, Philadelphia.
Dodd, H., and Prescott, F. (1943). *British Medical Journal*, **1**, 345.
Donaldson, M. (1913). *J. Obstet. Gynaec. Brit. Emp.*, **24**, 133.
Harvie, J. (1762). Manuscript Lectures at the Liverpool Med. Inst. Library.
Hewer, C. L. (1943). *Recent Advances in Anaesthesia*, p. 215, London.
Hirst, J. C. (1910). *N.Y. St. J. Med.*, **91**, 1204.
McDowall, R. J. S. (1941). *British Medical Journal*, **2**, 41.
Matthews, H. B. (1939). *J. Amer. med. Ass.*, **113**, 1183.
Moir, Chassar (1933–4). *Trans. Edinb. obstet. Soc.*, **54**, 93.
Phillips, Miles (1931). *British Medical Journal*, **1**, 833.
—— (1936). *Trans. Amer. Ass. Obstet. Gynec. abd Surg.*, p. 14.
Schwarz, O. H. (1923). *Amer. J. Obstet. Gynec.*, **6**, 155.
Shaw, Wilfred (1943). *Textbook of Midwifery*, p. 493, London.
Simons, E. J., and Rasmussen, C. C. (1925). *Minnesota med. J.*, **8**, 303.
Wiggers, C. J., and Werle, J. M. (1942). *Amer. J. Physiol.*, **136**, 421.

NERVOUS BREAKDOWN IN THE NAVY

DOMESTIC DIFFICULTIES AS A CAUSAL FACTOR

BY

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While it is generally agreed that prolonged psychotherapy has no place in the treatment of psychiatric casualties in the Services in wartime, this need not mean that the psychiatrist should concern himself only with diagnosis and institutional efforts at rehabilitation. In this paper the part played by the domestic affairs of the sailor in determining the onset and gravity of nervous breakdown is considered and suggestions are made for investigating and treating these difficulties more effectively. Psychological motivation is said (Kretschmer, 1934) to be due to combinations of causes, of which the least socially and morally acceptable possesses the greatest driving force and is furthest removed from consciousness, whereas that which the patient considers to be the most easily acceptable is in the forefront of consciousness and is the manifest cause of any reaction. Wartime propaganda is directed towards assigning to patriotism and devotion to duty the highest ethical values and stressing the subordination of the individual and the family to the State. In this present struggle, waged by conscript armies and navies, such a fundamental change of outlook might well give rise to conflicts, of which the most potent cause need not be the most obvious.

Aetiological Classification of Naval Psychiatric Material

In classifying the causal factors in mental illness it is usual to make a broad distinction between those that are determined mainly by the personality of the patient and those that are chiefly environmental. Though it is seldom possible to make a rigid distinction between endogenous and exogenous, yet for purposes of treatment and prognosis it is almost essential to divide the facts of the history in this way. Exogenous factors can be considered as forming a graded series, the members of which will vary in their closeness to the centre of the patient's personality. On theoretical grounds it would be reasonable to assume that those factors which most intimately affect this hypothetical nodal point of the personality would have the greatest strength in causing a nervous breakdown: the effects of domestic trouble are explicable on this basis.

Wartime psychiatry is greatly simplified because the individual environmental stresses in war are much more constant than they are likely to be in peacetime; for example, the living conditions of a sailor in his ship, which may be his home for years at a stretch, are so invariable as to be comparable to those artificially produced in a psychological laboratory. The effects of stress are evenly distributed throughout the ship's company, and, although there are differences in responsibility among the various ranks and ratings, so far as exposure to what are usually termed "the hazards of life afloat" are concerned all can truly be said to be in the same boat. The realization of this has led to the conception that the breakdown of a small percentage of a ship's company following an action is an indication of the poor morale of those who succumbed, and, because the majority stood up to the test, cannot be attributed to the conditions of the action. In some cases this may be true, but it is probable that this assumption accounts for only a small number of the men who break down under the stress of action.

On the basis of the observation of fairly large numbers of these cases, it appears more likely that unfavourable reactions to stress are due, in order of frequency, to the following causes: (1) constitutional weakness of the personality; (2) combinations of environmental factors; (3) simple bad morale, in the sense of "yellowness" or lowered social responsibility. It is with the second of these groups that this paper is chiefly concerned.

Effects of Stress

By the time a man becomes a frank psychiatric casualty, unless he belongs to the low-morale group, he has usually had to readjust or repress his former scale of ethical values, and the ease with which he does this depends upon his personality. Both in the last war and in this it has been noted (Beaton, in *The Naval Medical History of the War*; Curran and Mallinson, 1941) that the better types suffer affective changes in the direction of either depression or elation, usually combined with anxiety, whereas their less meritorious messmates react with hysteric symptoms. It has been observed, moreover, that affective disturbances in good personalities, when they are due to the effects of war service uncomplicated by other factors, respond surprisingly well to ordinary hospital conditions. It is those cases in which the causal factors are multiple that sometimes present unusual clinical states and, on the whole, do badly. In the Services, the return of a man to duty is a fair measure of the success of treatment; invaliding usually implies failure, and the invaliding rate may be regarded as an indicator of the virulence of a condition.

In the Navy there appear to be two groups of exogenous factors, which are not directly connected with the hazards of war: (*a*) the conditions and type of service, including reactions to authority, disappointments over promotion or the lack of official recognition of services, and other specifically Naval determinants; (*b*) domestic difficulties. Of these two groups the former is the commoner; but the latter, as will be shown, can give rise to the most virulent and intractable reactions, leading to invaliding in a high proportion of cases.

The home life of the sailor has been the subject of ribaldry and a cause of unhappiness for as far back as the lives of sea-going men are recorded. Among sea-faring peoples the subject has become part of the national mythology; it is not recorded that Jason or Ulysses suffered from anxiety states, but their behaviour on landing after long voyages showed considerable apprehension as to what might have happened at home in their absence, and the Norse sagas abound with references to these additional hazards of sea life. The Admiralty has evidently given much thought to this matter, and in peacetime every effort is made to enable the sailor to lead a double life with the minimum of discomfort and disruption of his material home.

But in wartime, although opportunities for reunion with the family are given whenever possible, many men must be separated from their homes for long periods. It is hardly surprising that such unusual conditions should sometimes lead to difficulties. I have had the opportunity of observing the results of these factors under two widely different conditions—for the first eighteen months of the war on the South Atlantic station, and for the past two years in a Naval hospital at home.

The total number of cases seen during the first period was too small to be of use for statistical analysis, but those seen during 1942 are given in the following table. In order to reduce any effect due to personal bias the figures are taken from the returns of two separate Naval hospitals and represent the combined opinions of at least five different psychiatrists. Only those cases are included in which the aetiological factors were quite definite, and these form, of course, a small proportion of the total number seen during the year.

Number of Cases during 1942

Aetiologica Factor	Returned to Duty	Invalided	Proportion Invalided
Domestic difficulties ..	58	32	35·6%
Enemy action (E)	137 } 226	56 } 82	29·0% } 26·6%
Conditions of service (C)	89 }	26 }	22·6% }
Total	284	114	28·6%

It will be seen from these figures that the percentage of men invalided from the group in which domestic trouble was the main causal factor is higher than in the other groups. The difference is not quite significant. Bearing in mind that a man is not invalided on compassionate grounds but because he shows symptoms of mental illness and is medically unfit for further service afloat or ashore, even though he may be in part responsible for his home difficulties, it is clear that domestic worry is at least as effective a factor as exposure to enemy action in causing breakdown leading to invaliding.

Where two or more factors, of which one is domestic trouble, are combined, the virulence of the reaction is considerably higher than when domestic worries alone are responsible. The following table illustrates this point, and the difference between the groups is significant, although the numbers are small.

Aetiological Factor	Returned to Duty	Invalided	Proportion Invalided
Domestic difficulties alone ..	37	12	24·4%
Domestic + E or C	21	20	48·7%
Total	58	32	35·6%

Although this observation might appear to be self-evident, it helps to explain some puzzling clinical pictures. It is a common experience for men to be sent into hospital with a psychiatric diagnosis and a history of exposure to enemy action which may be more or less recent; the history points to war experience as the cause of their breakdown, and the patient is often content, for various reasons, to allow it to be thought that this is the whole story. It is only after the condition has failed to respond to the usual treatment that a more thorough investigation and the interviewing of relatives reveal a sometimes long-standing anxiety over domestic affairs, to which war service has merely served as a catalyst in precipitating a psychopathological reaction.

The early recognition of the cause is of some importance both for treatment and in the assessment of attributability; for in these cases, if war service alone is considered responsible, the patient may become eligible for a pension. The following record illustrates this type of case:

Case 1.—A stoker petty officer, aged 32, with a previously stable personality and a clear record of twelve years' Naval service, had been abroad since Dec., 1940. He had been involved in the evacuation of Greece and Crete, and was subsequently employed in running supplies to Tobruk until Nov., 1941. He stood up to this long and continuous spell of hazardous work without feeling any ill effects, and carried on until Nov., 1942, when, following the loss of some merchantmen in the convoy his ship was escorting, he broke down and was admitted to hospital in Jan., 1943. On examination he was very depressed and agitated, and blamed the long spell of sea service for his condition. He made no mention of home worries, but in an interview with his sister the following facts came to light. In 1939 he had married against the wishes of his family, and was very devoted to his wife, who during the time he had been abroad had been sharing a flat with her sister, of whom the patient did not approve. Towards the end of 1941 she had written asking his permission to adopt the alleged illegitimate son of this sister by a foreign sailor, and to this the patient raised no objection. There was a hitch in the adoption proceedings when the man who had been, unbeknown to himself, cited as the father of the child proposed to the alleged mother and was accepted by her. As this might have led to a difficult family situation, fresh adoption papers had to be taken out and the name of another man given as the father. It was at this stage of the proceedings that the patient returned home, and, although he gave no indication of suspecting his wife of double-dealing, there was no doubt from his letters to her that he was extremely worried about the whole affair. The true facts, as attested by the patient's sister, were that the child was born to the patient's wife during his absence.

A welfare society was supplied with the facts of the case but took no action, which, considering the complexity and delicacy of the situation, was hardly surprising. At no time could the problem of the parentage of the child be discussed with the patient or his wife, but, no doubt relieved by the prospect of going home for good, he improved sufficiently to be discharged from hospital, and was invalided.

It is possible that, as the result of his war experience, this man would have broken down in any case, but it seems more likely that the sense of insecurity and anxiety over his home affairs was the primary factor and that the war experience served as a face-saving device. His reticence and his unwillingness to face up to the realities of the domestic situation, of which he could hardly have been unaware, support this view.

Types of Domestic Trouble

An analysis of the types of domestic trouble that have led to breakdown shows that the real or suspected infidelity of a wife or fiancée heads the list by a clear margin, followed by the illness or death of near relatives, including the prospect of childbirth; financial stress and the more concrete situational problems appear to give little trouble. In this connexion it was observed that out of the 42 patients whose breakdown was attributed to domestic factors during the eighteen months from Jan., 1940, to July, 1941, on the South Atlantic station, anxiety due to enemy action at home was given by only one as the cause of his condition. This period includes, of course, the time during which the "blitz" of England was at its height. To explain this curious fact on the basis of "out of sight, out of mind" would probably be incorrect; it seems more likely that an anxiety shared by many is easier to bear and its virulence is in inverse proportion to the numbers who have to put up with it. This is possibly analogous to the rarity with which sea-sickness, from which so many of the sea-going population suffer, is given as the primary factor in breakdown. It also appears to be easier to accept philosophically the personal share of a common disaster when it is at a great distance than when, as in the case of home-based personnel, it is spatially close to them. Again, the relatively lower virulence of the effect of enemy action is probably due to the fact that it is rarely a solitary experience, and morale can therefore be built up against it. By contrast with these communal stresses, which may be said to affect only the periphery of the personality, the infidelity of a wife affects the husband's self-esteem and is aimed at its very centre.

The Need for Thorough Investigation

The record below illustrates the difficulties that may be encountered in the investigation of a case of this kind:

Case 2.—A South African stoker, aged 35, was admitted to hospital ship for the investigation of an intractable dyspepsia, which rendered him useless for duty. No organic abnormality was discovered, but the patient stated that he was very worried about the behaviour of his wife, who, he alleged, was living with another man, squandering his money, and neglecting his home and child. His story, which had some documentary support, was vouched for by the captain of his ship, who had already given him a spell of compassionate leave on the same grounds. On the strength of a recommendation backed by his commanding officer, the Commander-in-Chief granted a further period of leave to enable him to divorce his wife and arrange for the care of his child. On his arrival in Capetown, investigation by the chaplain at the base failed to confirm the man's story, and his subsequent desertion made it probable that the whole tale was a tissue of lies.

This case is instructive in showing the necessity for thorough social investigation, and also because it demonstrates how misguided would have been the alternative measure of invaliding such a man on the grounds of his dyspepsia.

Methods of Investigation

The inquiry into the circumstances and the treatment of such cases is by no means easy: under the existing system the divisional officer is responsible to his captain for the individual welfare of his men; this responsibility is shared to some extent by the chaplain in a big ship or at a shore base. That more men do not go sick from this cause under the exacting conditions of Naval service is a tribute to the efficiency of the system as much as to the stability of the men themselves. The introduction of airgraph letters and cheap cable rates has undoubtedly done much towards allaying the anxiety of men on foreign stations; nevertheless there does seem to be a need for a more specialized branch of social welfare organization to which complex and difficult cases could be referred, especially by the psychiatric specialists in depots, where such cases are usually first seen.

Much can be done, and is being done, by the existing welfare societies, but, since in peacetime it has been found necessary to employ specially trained workers in this field, the need can scarcely be less great in wartime. It is sometimes objected that the Englishman will not tolerate interference in his private affairs, but this prejudice is not borne out by personal experience or by the records of the psychiatric social services. The epic success of a follow-up of 100 families in which both parents had committed suicide marks a high level of achievement, and is a tribute to the workers who carried it out without a single rebuff. The growing demand for trained psychiatric social workers in clinics and voluntary hospitals is an indication that this kind of work is needed and can be effective.

It is possible that a further expansion of the social services—as, for example, by the appointment of a psychiatric social worker to Naval depots—might lead to a reduction in the invaliding rate from this cause. The work of the psychiatrists in hospitals and barracks would be greatly helped by such an arrangement, and it seems possible that the executive branch might also welcome assistance in carrying out what must be a difficult and time-consuming part of their duties.

Summary

The role of domestic difficulties in causing nervous breakdown in the Navy is compared with that of other aetiological factors; special note is made of the bad prognosis in these cases and in those in which there are multiple causal factors. The various types of home worry and the possible causes of its virulence are discussed. The need for thorough investigation is illustrated, and a suggestion is put forward for the enlistment of the services of psychiatric social workers to supplement the existing arrangements.

References

Beaton, T. *The Naval Medical History of the War*, Admiralty, London.
Curran, D., and Mallinson, W. P. (1941). *British Medical Journal*, **1**, 305.
Kretschmer, E. (1934). *Textbook of Medical Psychology*, tr. E. B. Strauss, London.

THE TONIC ACTION OF STRYCHNINE

BY

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Strychnine is often used as the principal constituent of tonic mixtures. This custom is in part dependent on the belief that in therapeutic doses this drug has a beneficial action on the gastro-intestinal tract, promoting the appetite, rendering the digestive processes more efficient, and thereby increasing weight and general well-being. Strychnine, of course, in virtue of its taste has the action associated with simple bitters which reflexly increases the appetite and the flow of gastric juice. Therefore, in order to determine whether strychnine has any effects other than those due to the taste the drug should be given parenterally.

Experimental Findings

The present research was carried out with the view of finding whether strychnine administered parenterally had any action on gastric digestion and whether any evidence could be obtained in support of its use as a tonic.

Effect of a Single Dose of Strychnine on the Secretion of the Fasting Stomach.—Four specimens of fasting juice were aspirated at 15-minute intervals. Thereafter 1/20 gr. of strychnine was injected subcutaneously and the juice again withdrawn during the succeeding hour. In four subjects with normal gastric acidity there was an increase both in the volume and in the hydrochloric acid content of the gastric juice after administration of the drug. In three patients with achlorhydria the strychnine failed to stimulate the secretion of hydrochloric acid or to alter significantly the volume of the secretion.

Effect of a Single Dose of Strychnine on the Movements of the Fasting Stomach.—Bennett (1923) stated that small doses of strychnine had a beneficial effect on gastric atony, and quoted Berti to show that as small a dose as 0.5 mg., given orally, caused increased gastric peristalsis. Dickson and Wilson (1925) also maintained that strychnine increases gastric motility. Bastedo (1936) stated that it increased the height of the hunger contractions. Clark (1940), on the other hand, affirmed that strychnine had no effect on gastric movements even when given in large doses. In the present investigation 1/20 gr. of strychnine hydrochloride was given after a period of at least five hours without food or water. Gastric motility was recorded by a modification of Carlson's balloon method (Anderson, 1943). In eight subjects the strychnine was given during a period of quiescence, and in each of them strong gastric contractions appeared after an interval of 5 to 15 minutes, and lasted from 20 to 45 minutes. The movements so produced were strong, and the interval between each wave tended to become shorter towards the end of the period of contractions. In two subjects the strychnine was given after a period of contractions had lasted 35 and 45 minutes respectively; in each case a prolonged period of quiescence followed the administration of the drug. The quiescent phase may have been due to fatigue of the gastric muscle.

Effect of Continued Administration of Strychnine on the Response of the Gastric Secretions to a Test Meal.—The subjects of this investigation were 2 men with a slight degree of hyperchlorhydria and 5 with achlorhydria. Strychnine hydrochloride gr. 1/30 was given subcutaneously three times daily for three to four weeks. Test meals were given before and at the end of the period of strychnine medication. In one patient with hyperchlorhydria the maximum percentage of hydrochloric acid was reduced, while in one achlorhydric a small amount of free hydrochloric acid appeared. In no other patient was there any significant change in the secretion of acid. In four subjects the emptying-time was shortened, while in the other three it was unaltered.

Effect of Subcutaneous Administration of Strychnine on the Weight and General Condition.—Ten patients convalescing from various types of illness were employed for this investigation. In all, the weight had been stationary for three weeks before the drug was given. In addition the haemoglobin had been estimated together with the red and white cell counts. The strychnine was given subcutaneously in doses of 2.9 mg. three times daily for periods of 14 to 28 days. All the patients were on full ward diet and were all encouraged to eat as much as they desired. There were no significant changes in either the haemoglobin percentage or the cell content of the blood. Five patients showed an increase in weight of 1 to 5 lb., while in three patients there was a decrease of 1 lb. and in two there was no alteration.

Effect of a Single Injection of 1/20 gr. of Strychnine on the White Blood Cells.—Sollmann (1936) states that *in vitro* phagocytosis is hindered by very large doses of strychnine, while Edmunds and Lloyd (1923) find an increase in the white cells in healthy dogs. In two patients who received a subcutaneous injection of 1/20 gr. of strychnine no significant change in the number or distribution of white cells was noted.

Summary

From these investigations on strychnine three positive findings emerge: this drug appears, first, to stimulate the fasting stomach to active contractions; secondly, in some cases to hasten the emptying-time after a test meal; and, thirdly, to increase the volume and acidity of the fasting gastric juice. No evidence has been here

adduced to indicate that the parenteral administration of strychnine leads to any improvement in the general condition of the patient.

I should like to express my indebtedness to Prof. Noah Morris for his help, and to the Medical Research Council for a grant towards expenses.

REFERENCES

Anderson, W. F. (1943). *Lancet*, **1**, 40.
Bastedo, W. A. (1936). *J. Amer. med. Ass.*, **106**, 85.
Bennett, T. I. (1923). *British Medical Journal*, **1**, 366.
Clark, A. J. (1940). *Applied Pharmacology*. London.
Dickson, W. H., and Wilson, M. J. (1925). *J. Pharmacol.*, **24**, 33.
Edmunds, C. W., and Lloyd, P. C. (1923). *Amer. J. Physiol.*, **63**, 392.
Sollmann, T. (1936). *A Manual of Pharmacology*, Philadelphia.

Medical Memoranda

Mechanical-lung Treatment of Pneumonia complicating Acute Poliomyelitis

The following case is reported because of the excellent results obtained by using the mechanical lung in the treatment of pneumonia in a patient who was almost moribund.

CASE HISTORY

The patient was admitted to hospital on Aug. 22, 1943, as a transfer from another hospital. His history up to that time is described from the notes which accompanied him and from his own observations.

On the morning of Aug. 20 the patient, a warrant officer aged 25, reported sick with a severe headache. By evening his headache was very bad, he had developed pains in the back, and he felt feverish. On admission to hospital he was found to have coarse rhonchi in the left base of the chest and also a few rales; there was no dullness. He was ordered sulphapyridine 2 g., four hours later 2 g., and then 1 g. four-hourly. The next morning he complained of pain in the back, pains down the front of his thighs, and weakness. His eyes were suffused. By evening the signs in his chest had subsided and he was taken off sulphapyridine, having received 8 g. Headache was slight at the time and he had no bodily pains. In the afternoon he had attempted to get out of bed, but found he could not do so, although he could sit up. Next morning he could neither sit up nor move his lower limbs. Knee- and ankle-jerks and superficial abdominal reflexes were absent. He was transferred to this hospital as a case of acute anterior poliomyelitis.

Aug. 22.—Examination showed a young man of anxious expression and very apprehensive, well nourished, and well developed; his face was a little cyanosed. At 2 p.m. his temperature was 101°, pulse 60, and respirations 26; breathing was entirely diaphragmatic. Abnormalities in muscle power and reflexes were: left and right triceps and right serratus magnus flaccid; deltoids moderately strong; pectorals and biceps strong; biceps reflexes brisk; intercostals and abdominal muscles flaccid; superficial abdominal reflexes absent; back and buttock muscles flaccid; thighs flaccid; knee-jerks absent; slight power in left gastrocnemius, right flaccid; ankle-jerks absent; moderate power in left tibialis anticus and peronei; slight power in right anticus and peronei; plantar reflexes flexor. Muscles were not tender, and there were no abnormalities of sensation. Paresis of the bladder was present, and the sphincters were continent. His white cell count was 10,800 per c.mm.—polymorphonuclears 82%. The cerebrospinal fluid contained increased globulin, 15 cells per c.mm.—polymorphs—and was sterile. The only other finding was diminished breath sounds at the right base, posteriorly.

Aug. 23.—T. at 6 a.m. 101.6°. Catheterized twice; vomited twice.

Aug. 24.—T. 99.4°, P. 70, R. 24 at 10 a.m. Was more cyanosed. Percussion note dull at right base posteriorly and V.F. increased. Breath sounds faint over right posterior lower third of chest; no adventitious sounds. Apex beat not displaced. Partial collapse of right lower lobe—liver's interference with diaphragmatic action considered the probable cause. The head of the bed was raised.

Aug. 25.—T. 102.8°, P. 86, R. 36 at 6 a.m. Further cyanosed. Chest signs unchanged. Radiograph of chest showed opacity of irregular density of right lower third, with some mottling of middle third and increased right hilar shadows. Lobar pneumonia, right lower lobe, diagnosed. Fowler position adopted and 2 g. of sulphathiazole given, to be followed by 1 g. four-hourly.

Aug. 26.—T. 99°, P. 100, R. 36 at 6 a.m. At 6 p.m. his general condition was worse and he looked a bad colour. Bubbling rales could be heard at some distance and he was unable to cough. Some viscid sputum from time to time collected at the back of his throat and was swabbed out of his mouth. When passing through the larynx it caused considerable respiratory distress, and on two occasions he vomited, bringing up sputum. Respirations 46, shallow and jerky. Oxygen given by nasal catheter. At 11 p.m. was mildly delirious and looked gravely ill.

Aug. 27.—At 2 a.m. he was delirious and ashen in colour. There were loud bubbling rales, and a rattle in his throat. P. 140, R. 44. He was placed in the mechanical lung, head end raised on 9-in. blocks. (The respirator had been completed by the Military Engineering Service only three hours earlier, they having done the job in a day.) At 5 a.m. there was a dramatic improvement. Cyanosis was slight, pulse 92, and orientation normal, though the patient was apprehensive of the lung and wanted to be taken out. Breathing was quiet and no rales could be heard. The lung was working at 25 respirations a minute and at pressures of − 14 cm. H_2O, + 4 cm. H_2O. At 8 a.m. the patient was removed from the lung to be catheterized and made comfortable. R. 36, P. 116 after 10 minutes, and cyanosis returning. Replaced in lung after half an hour, and pulse soon settled to 96 a minute.

From this time on he made good progress and finally left the mechanical lung on Sept. 8. On Oct. 1 his paralysis remained much as on admission, except that the upper-arm muscles were much weaker. His bladder function returned on Sept. 1.

The striking effect of the mechanical lung was the change it produced in the chest—from a "bubbling cauldron" to quiet breathing; for no rales were audible after 8 a.m. on Aug. 27.

I am indebted to Col. C. H. N. Baker, Officer Commanding, for permission to publish this case.

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Tuberculous Infection of an Extrapleural Pneumothorax complicated by Cl. welchii Infection

It may be of interest to record a case of pulmonary tuberculosis in which a tuberculous effusion in an extrapleural pneumothorax was sterilized by the use of "azo-T." Subsequent infection by *Cl. welchii* was successfully treated by azo-T lavage and sulphathiazole instillations.

CASE HISTORY

A woman aged 35 had been treated for bilateral pulmonary tuberculosis since June, 1939, by extrapleural pneumothorax on the right and intrapleural pneumothorax on the left, the latter being abandoned in Feb., 1942. The right extrapleural pneumothorax was satisfactory until Oct., 1941, when fluid first appeared. In Dec., 1941, the fluid was thin, straw-coloured, and lymphocytic, and contained scanty tubercle bacilli. In Nov., 1942, the character of the fluid had changed; it was then muco-purulent, polymorphic, and there were numerous tubercle bacilli.

Out-patient treatment by aspiration and injection of azochloramide and sodium-tetradecyl sulphate on the lines recommended by Petroff (*Amer Rev. Tuberc.*, 1941, **44**, 738) was instituted on Jan. 19, 1943. Aspirations were at first carried out on alternate days and later twice weekly. The fluid gradually became thinner, and the number of tubercle bacilli decreased until on Feb. 22 no bacilli were present. The fluid remained thin for the next three weeks, but pus cells were persistent. On March 16 the presence of fungal hyphae was noted, and culture of the fluid gave a moderate growth of *Penicillium glaucum*. This persisted in the next two specimens. On March 22 the patient complained of pain in the right side of the chest, and her temperature was 100° F. Her general condition was quite good, but in view of her symptoms she was admitted to hospital. Aspiration was performed on the same day, and next day the bacteriologist reported the presence of *Cl. welchii* in large numbers. *Cl. welchii* serum was administered at once, 40,000 units being given intravenously and 60,000 units intramuscularly. Sulphapyridine was given by mouth, but was replaced by sulphathiazole on March 25, owing to extreme nausea. A further aspiration was performed on March 24, and the bacillus was still present in large numbers.

On March 25, following consultation with Mr. Fatti, treatment by injection of sodium sulphathiazole into the extrapleural cavity was started. The exudate was first removed as completely as possible and lavage of the cavity with azo-T solution performed. Sodium sulphathiazole 8 g., dissolved in 100 c.cm. of normal saline, was then injected. The process was repeated on March 29 and 31. The fluid on both these occasions was negative for *Cl. welchii* and for tubercle bacilli. On March 29 the sulphathiazole content of the clear fluid obtained after autoclaving was 10 mg. per 100 ml., and on March 31, 17 mg. per 100 ml.

The patient's general condition remained surprisingly good and, apart from the extreme nausea caused by the oral chemotherapy, she had no complaints. Her temperature became normal on March 26, and remained so for the rest of her stay in hospital. The white cell count was not affected by the infection or the treatment, the total counts remaining between 7,600 and 8,200 per c.mm., and the differential counts being within normal limits. Fluid gradually reaccumulated in the extrapleural space, and aspiration was again performed on May 4, when the resulting thin, slightly blood-stained, straw-coloured fluid contained only degenerate polymorphs, but no organisms.

The patient was discharged from hospital on May 8, 1943, and has since attended for two further aspirations—in June and July. On both occasions the fluid was thin and sterile.

My acknowledgments are due to Dr. J. N. Deacon, Medical Director, Redhill County Hospital, for permission to publish this paper, and to Dr. A. S. Hall and Mr. L. Fatti for advice on treatment.

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Reviews

RECONDITIONING BY PHYSIOTHERAPY

Rehabilitation, Re-education and Remedial Exercises. By Olive F. Guthrie Smith, M.B.E., C.S.M.M.G. With foreword by Lord Horder. (Pp. 412; illustrated. 25s.) London: Baillière, Tindall and Cox. 1943.

The scope of this book is aptly summed up in Lord Horder's foreword. "Reconditioning and rehabilitation," he says, "are in the air; with many folk who pay lip-service to these ideas they remain in the air. In Mrs. Guthrie Smith's book we 'get down to brass tacks,' we follow the special techniques that are appropriate for particular cases, and we realize the extent and the intensity of modern developments in physiotherapy."

For many years the author has preached the gospel of rehabilitation through active exercise, and has earned for herself a deservedly wide reputation for her pioneer work in this field. In her introductory chapter she outlines the basic principles of exercise therapy and deals with the psychological aspects of rehabilitation. In this latter connexion one sentence deserves to be quoted: "The whole art of rehabilitation is to put the responsibility of his own salvation on to the patient, while at the same time making it possible for him to accept this responsibility."

After reviewing the physical and physiological principles underlying exercise therapy, the author proceeds to a detailed account of the various types of exercise appropriate to the re-education and redevelopment of injured or diseased muscles. One of the most important principles in any exercise system is that of progression. In the earliest stages of extreme weakness, such as in poliomyelitis, the muscles require positive assistance—the exercise must, in fact, be "weightless." At the other end of the scale the muscles of labouring men must be hardened by making them work against resistances approximating to the stresses of their work. The physiotherapist must be able to pass from one end of this scale to the other by almost imperceptible stages, and the main part of this book is concerned with a detailed account of how this is done. The author is a pioneer in the development of "weightless" or "suspension" exercises for the early cases, and this is the first account in book form of her original work.

In dealing with resistance technique the various uses of pulley-and-weight apparatus and of springs are discussed, though it is perhaps not sufficiently stressed that these resistance methods have their dangers as well as their advantages. In certain conditions—e.g., in knee-joint injuries—it is of crucial importance to use the correct amount of resistance at all stages, and we hope that in a future edition the author will have something to say on these important matters of dosage and timing in relation to resistance technique. Supplementary chapters, dealing with recovery after fractures, rehabilitation of chest and maternity cases, recreational therapy, electrotherapy, joint manipulation, and plastic operations, are contributed by experts in these particular fields.

This book is well written, well illustrated, and original and stimulating in its outlook. It deserves to be read not only by the physiotherapists to whom it is primarily addressed, but by every surgeon and physician who would wish his direction of the physiotherapist to be intelligent and progressive.

CONSPECTUS OF PROGRESS IN MEDICINE

The 1943 Year Book of General Medicine. Edited by George F. Dick, M.D., J. Burns Amberson, jun., M.D., George R. Minot, M.D., William B. Castle, M.D., William D. Stroud, M.D., and George B. Eusterman, M.D. (Pp. 784. $3.00.) Chicago: The Year Book Publishers.

The *Year Book of General Medicine* can be relied upon to give a comprehensive view of its swiftly changing panorama. The current volume is no exception to the rule. It is not surprising that a good deal of attention is paid to problems connected with blood transfusion—hence the discussion of the Rh factor, the dosage of either albumin or plasma after a severe injury or burn, and the causes of severe haemolytic reactions. Epidemiology is represented by a thoughtful paper on influenza by C. H. Andrewes, another on malaria as a world menace, and another on epidemic catarrhal jaundice as typically a military disease which shows regional variations. It is surprising to learn that 2,500 cases occurred during the short battle of Crete. Deficiency in a particular ingredient of the vitamin B complex, which has been labelled "N," is believed by R. M. Calder to aggravate damage to the liver cells. Ankylosing spondylitis is described as a complication of brucellosis. Kidney diseases come in for consideration, particularly in relation to hypertension, and it is interesting to note that, after several swings of the pendulum, lipoid nephrosis is no longer regarded as a separate entity, but merely as a stage in nephritis through which some cases pass. The derided doubters can now recover their self-esteem.

Wartime conditions add to the clinical importance of acute pulmonary oedema. Luisada argues that the physician should have at hand morphine, atropine, sodium phenobarbital, and papaverine hydrochloride. The first three are best when toxic gases, drowning, or skull injuries are the cause of the attack, while in cardiovascular conditions the first two and the last one are to be preferred. Newer concepts in the diagnosis of congenital heart diseases based on clinical and angiocardiac *x*-ray studies are fully discussed. We would suggest, however, that a classification based on the embryology (and therefore on the evolution) of the mammalian heart would make more intelligible what many otherwise find a mere collection of bizarre distortions. Industrial medicine has received a recruit in the awkwardly named condition of bagassosis. Bagasse is the broken sugar-cane after the sugar has been extracted and is used in the preparation of board. Although this contains 5.7% silica the symptoms differ in several respects from any known form of silicosis, as shown by Castleden and Hamilton-Paterson in our columns (*B.M.J.*, 1942, **2**, 478). These are but a few of the many interesting subjects discussed in the *Year Book* for 1943.

DR. PARKES WEBER'S WRITINGS

F. Parkes Weber's Collected Writings. In Celebration of his 80th Birthday and 50th Anniversary as Visiting Physician to the German Hospital, London. May 8, 1943. Edited by the Medical Staff.

The combination of enthusiasm for clinical research and a profound knowledge of medical literature has given Dr. Parkes Weber a unique position in the profession. It was a happy thought, therefore, for his colleagues at the German Hospital to celebrate the 50th anniversary of his election to their staff and his 80th birthday by planning a *Festschrift*. Wartime restrictions have prevented this from taking the form of printing even a selection of his more than a thousand papers. The reported speeches delivered on that occasion were characterized by sincere admiration rather than by eloquence, and, apart from the bibliography, the principal value of this book is the excellent synopsis of his principal contributions compiled by Dr. K. Blum. Dr. Parkes Weber has collected rare diseases as some have collected rare butterflies, but to imagine that it is merely rarity value which appeals to him would be to misinterpret the whole purport of his work. He has used rarities to help towards the explanation of problems of general interest, as the late Sir Archibald Garrod did in his *Inborn Errors of Metabolism*, though he has cast his net more widely. Thus there are pioneer observations on polycythaemia, erythrocyanosis, telangiectases, panniculitis, the "pink disease," and the condition now known as Cushing's syndrome. In some instances he has approached generalizations which cannot yet be fully formulated in the present state of our knowledge. This applies particularly to his work on endocrine tumours and abiotrophies. When the time is ripe for such a synthesis it will be found that much of the material has been provided by Parkes Weber. Nor has medicine exhausted his interests, which include numismatics and archaeology.

It is a striking record of what may be accomplished by a man whose ability is accompanied by perennially youthful joy in research and an insatiable thirst for knowledge. We believe that this must have provided him with a happy life, for he radiates generous helpfulness to others. He has received many honours, including the Moxon Gold Medal from the Royal College of Physicians, and, having become the Nestor of medicine, is secure in the affectionate admiration of his colleagues.

INJURIES OF SKULL, BRAIN, AND CORD

Injuries of the Skull, Brain and Spinal Cord. Neuro-Psychiatric, Surgical and Medico-Legal Aspects. Edited by Samuel Brock. Second edition. (Pp. 616; illustrated. $7.00 or 38s. 6d.) Baltimore: The Williams and Wilkins Company; London: Baillière, Tindall and Cox. 1943.

Though many of the chapters in this second edition have been modified slightly in the process of revision there are only two outstanding additions—references to the use of sulphonamide drugs in the treatment of wounds and of meningitis, and an instructive account of electro-encephalography after head injury. As only three and a half years have elapsed since the first edition appeared, the small amount of alteration of the work as a whole is scarcely to be wondered at, more especially as the authors are experts, who would therefore have contributed material which was fully up to date in the original edition. It remains a book which will prove most useful to neurologists, surgeons, and psychiatrists who take a special interest in cerebral trauma, for they not only will find much that is of value in the text, but will also be greatly assisted by the numerous but carefully chosen references to the literature. It is not intended as a textbook for undergraduate students, nor will it be fully appreciated save by those who frequently encounter the problems with which it deals.

The chapter on the electro-encephalographic changes which occur in cerebral injury is a helpful guide to anyone who wishes to gain an impression of the methods employed and of the pitfalls that must be avoided in the interpretation of the tracings. A great deal is being learnt about cerebral injury during the war, both in the advanced and in the base areas, and we look forward to seeing these aspects of the subject dealt with as additional matter in the next edition.

Notes on Books

Fifty years ago the late Prof. EMMETT HOLT first published his *Care and Feeding of Children*. Since 1924 its revision has been in the hands of his son, and now a sixteenth edition has been issued (D. Appleton-Century Company $2.00). It is intended for the intelligent mother and is largely in the form of question and answer. The book remains, in its latest enlarged revision, a most reliable manual of instruction in the difficult art of successful mothercraft.

The Tuberculosis Association of India has published from 20, Talkatora Road, New Delhi (price 12 annas) a *Directory of Tuberculosis Institutions in British India and Indian States* for 1943. This is designed to give ready and reliable information about the facilities for the treatment of persons suffering from tuberculosis at dispensaries, sanatoria, and other institutions. The first part occupies 70 pages and the second part 20 pages, followed by an index of places listed in British India and in Indian States.

A Supplement to the 22nd edition of Vol. I of the *Extra Pharmacopoeia* (Martindale) has been published for the Council of the Pharmaceutical Society of Great Britain by the Pharmaceutical Press, 17, Bloomsbury Square, W.C.1, price 2s. (plus 2d. postage). It is a pamphlet of 48 pages, recording many changes that have been made, chiefly on account of war conditions, in the *British Pharmacopoeia* and the *British Pharmaceutical Codex*. For the convenience of prescribers and suppliers tables are included taking note of the principal changes made by the publication of a *National War Formulary* and of changes made in the *United States Pharmacopoeia* and the new *U.S. National Formulary*. The pamphlet ends with a summary of recent Statutory Orders affecting supplies of drugs, etc., some newer proprietary names, and corrigenda for Vol. I of the *Extra Pharmacopoeia*.

The second edition of *Revelation of Childbirth*, by Dr. GRANTLY DICK READ (Heinemann; 21s.), is certain to be widely read both by doctors interested in obstetrics and by members of the general public. The theme is babes without fears, and the author presents a strong case to show that fear is the root of much evil in obstetrics. This is by no means a new concept, but nevertheless Dr. Read deserves full credit for the publicity he has given it by word and deed. One wonders whether the cause he sponsors—and what nobler one could be imagined than the allaying of the fears and the pains of childbirth?—is aided as much as it could be by this edition. Constant repetition wearies even the most sympathetic reader and is apt to irritate the critical one. A much-condensed volume would present the case more clearly and forcibly. If such a volume were written it would with benefit omit most of the frequent references to the opposition of the "orthodox profession" to Dr. Read's ideas. These references may make entertaining reading to a "*Citadel*-minded" public, which will also doubtless enjoy the jibes at obstetrical specialists and anaesthetists, but they achieve no positive results. Medical readers will wonder where all this opposition has been found, and may perhaps be forgiven for wondering if Dr. Read has not been unduly suspicious of even his friends.

E. and S. Livingstone of Edinburgh have published a fourth edition, revised and enlarged, of *Diseases of the Eye*, which forms one of the Catechism Series (price 1s. 6d., plus 3d. postage). The strength of this booklet is its concise orthodoxy. The new edition shows evidence of reluctant departure from orthodoxy on several points. Revision of the text for a further edition might with advantage be entrusted to an impenitent iconoclast.

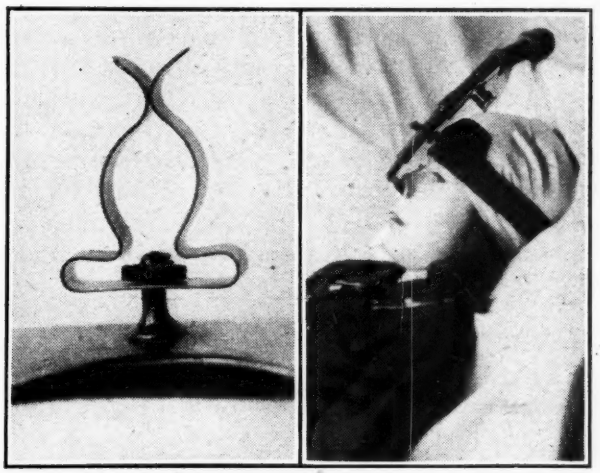
Preparations and Appliances

A HEAD HARNESS FOR ENDOTRACHEAL ANAESTHESIA

Dr. A. OWEN-FLOOD (London, N.8) writes:

Most anaesthetists have experienced the annoying episode of the endotracheal tube slipping out of place when applied through either the nasal or oral route. It occurs mostly when the patient is placed in the Trendelenburg position during an abdominal operation. There is an avalanche of pillows, tube, and connecting gear, falling with a loud clatter to the floor. The patient promptly "comes out" and starts to strain his intestines through the incision. The surgeon gives the anaesthetist a glance aptly described in Ireland as "a look like a summons," and the latter's frantic efforts to find and replace another sterilized tube produces an atmosphere described in diplomatic parlance as "tense."

The little device here illustrated avoids all this. Its construction is simple and the cost of materials negligible. Nearly every practitioner has in his possession a laryngologist's reflecting mirror clamped to a forehead plate by a small metal post



surmounted by a knob. Detach the mirror and clamp and file off this knob, leaving as much of the post as possible. Obtain from any hardware stores a good high-grade tempered steel clip (Terry's is a suitable type) of sufficient size to retain the connecting-tube holder on the Boyle's apparatus or other source of anaesthetic. The clip is placed on to the post of the forehead plate. It is not necessary to use a rimer as the hole in its base fits snugly on the post. Place a small washer over the latter and fix this firmly to it with a blob of solder. Take care that the solder does not fall on the clip. This must not be fixed to the washer, but should be allowed to rotate freely in its horizontal axis around the post.

When in use the plate is attached to the patient's head by its original strap, and the connecting joint to the anaesthetic apparatus is fitted in the clip. This is in turn connected with the tracheal tube protruding from the nose or mouth by any type of connector which ensures a clear airway.

Supplies of "tabloid" brand "iodicin" (capsules), gr. 3, in tins of 50 and bottles of 250, are again available. Wartime conditions have necessitated a change in the shape of the capsules, but the therapeutic activity is unaltered. "Iodicin" is an organic iodine preparation for oral administration in place of the inorganic iodides. Descriptive literature can be had from Burroughs Wellcome and Co., 12, Red Lion Square, W.C.1.

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THE HEALTH OF NEW YORK

The health department of New York City realizes that the health records of any year lose much of their interest if they are not published promptly. On each New Year's Day, therefore, Dr. Ernest L. Stebbins, the health commissioner, presents to the Mayor and issues to the Press a summary report for the year that ended the night before. War apparently is no obstacle. The report for 1943 is quite a substantial document running to thirteen closely typed foolscap pages, and comparing the more important of the year's statistics with those which have gone before. There appears to be no valid reason why our own public health units should not be able to do the same.

The population of New York is 7,625,000. It is therefore the most populous urban unit for which comprehensive health data are available, and big enough to give its annual figures meaning without the cruder statistical fallacies. For many years the improvement in the mortality from most causes and in the incidence of some diseases has been great and continuous. For instance, the infant mortality rate has fallen from 120 per 1,000 live births in 1900–9 to 30.2 in 1943; and the neonatal rate from 36.2 in 1910–19 to 21.5, a decline of 40% even in this most refractory part of the child mortality. Rates such as these are not exceptional in the U.S.A., or indeed in some British Dominions and foreign countries; but no large city in the United Kingdom can approach them. Both rates were, however, a little higher than in 1942, mainly because of diarrhoea, pneumonia, and accidents. The maternal mortality rate, also, which remained long at a high level in New York, has dropped from 6.0 per 1,000 live births in 1931 to 2.1, and is now lower than the 1942 rate for London. As elsewhere, the greatest decline has occurred since the introduction of sulphonamides in the middle 'thirties, and it is therefore probably most evident in the septic causes.

There is little interruption in the well-known campaign to extinguish diphtheria in New York. In this huge population 281 cases were notified in 1943—the lowest number on record—compared with an annual average of 14,282 in 1910–19 among a much smaller population. Six large districts of New York have recorded no deaths for periods varying from 5 to 8 years. The health commissioner expresses concern that the deaths in the whole city rose from 7 in 1942 to 16 in 1943. In 1942 London County, with fewer than 4 million people, had 1,813 cases and 51 deaths. This is a measure of the leeway we have to make up in immunization. But perhaps even more striking is the falling mortality from measles and whooping-cough, diseases which have not materially changed in their periodical incidence and which have been uninfluenced by any systematic application of specific prophylaxis. The mortality from measles per 100,000 children under 5 years of age has fallen from 27 in 1930–3 to 2.5 in 1940–3; whooping-cough from 29 to 10.3. As elsewhere, measles, though more common—or perhaps more commonly recognized—is now by far the less fatal of these two diseases.

New York, however, has not entirely escaped the health hazards of war. Meningococcal meningitis had been at a low ebb, with 48 cases and 17 deaths in 1940, when it was ravaging this country. Since then it has increased continuously, and more rapidly during the last two years, when 411 cases with 84 deaths and 1,412 cases with 233 deaths were respectively recorded. The case-mortality rate was 16.5% in 1943 compared with 50% only a few years ago—another instance of the beneficent effect of sulphonamides. The decline of tuberculosis also has been interrupted. The rate for 1942 had been a low record at 46.2 per 100,000 from all forms of the disease; in 1943 it was 47.9, both the respiratory and other forms contributing to the rise. Apparently the exceptional increase in meningeal tuberculosis which was a feature of the British statistics of 1940 has not been observed in New York. The health commissioner attributes the retrogression to the fact that people with previously healed lesions have succumbed to the overwork of wartime. In comparing the New York tuberculosis rates with those of British towns an increment of about 15% should be allowed for residents dying elsewhere without transfer of the death record. Since 1941 venereal diseases have become more prevalent. In the first eleven months of 1943, 23,594 cases of syphilis of all types were recorded. The number of early infectious cases reported in the first ten months of the year was 3,433, representing an excess of 39% over the figure for the corresponding period of 1941; and the 15–24 age group was especially affected. The anti-venereal-disease campaign has been intensified. The health commissioner also expresses concern about an increase in deaths from pneumonia, the rate per 100,000 having risen from 39 in 1942 to 50.5 in 1943. There was an excess in almost every month in comparison with the previous year. He regards it as disturbing in view of the availability of specific means of treatment. The really great increases in certified causes of death, however, are revealed, as in most civilized countries, among the chronic diseases of later life. The rate of diabetes has risen from 25.7 in 1930 to 42.7 in 1943; for cancer (unstandardized) from 117 to 172.7; and from that heterogeneous group which includes diseases of the heart, arteries, and kidneys, and apoplexy, from 381.5 to 533.1. That these increases are due mainly to more accurate certification or classification and to changes of medical fashion, and only to a slight extent to change in the real causes of death, may be concluded from the fact that the crude general death rate has remained virtually stationary throughout these years (10.9 per 1,000 in 1943), although the population affected has been growing older and therefore more likely to swell these categories in the lists of death.

The prompt issue of New York's health statistics each year will make it possible to follow closely the course of events in wartime and perhaps to learn new lessons. Will diphtheria remain at a low level if drafts of medical men and nurses to the fighting Forces make it impossible to keep up the level of immunity of the children? Will tuberculosis increase from wartime strain and, even in America

from some degree of food shortage? Or will fuller employment and higher wages counteract these latter influences? Will influenza, which touched New York in December as it did here, return with renewed force this year or next and smudge the whole statistical picture? At least we shall not be kept long waiting to know about it. In the meantime it must be recognized that much of the success achieved in New York is due to the vigour and persistence with which both the health department and voluntary organizations have applied themselves to the education of the people in health matters. We need not wait to learn this lesson.

A TOXIC FACTOR IN TRAUMA

Traumatic shock is the name given to a clinical syndrome fairly common in centres of industry even in times of peace. In war, however, it provides problems which are urgent everywhere. At the end of the last world conflict it was commonly believed that the shock which appeared some time after the injury was the result of some toxic absorption from the damaged tissues, and all that was left unsolved was the isolation of the toxin. Since then this view has lost much of its appeal, and attention has been paid to adrenal exhaustion, loss of fluid, and reduction in the activity of the sympathetic nervous system. Evidence exists which favours every one of these as an important factor in the pathogenesis of shock, and much of the modern treatment of shocked patients derives from the conception that the maintenance of an efficient circulatory volume is all-important. While the need for transfusion is granted, there are records of too many cases in which the loss of fluid, even when calculated generously, is insufficient to explain the clinical phenomena. Recent work by H. N. Green[1] suggests a return to the hypothesis of toxaemia. Using rats with experimentally produced hind-limb ischaemia, he found that survival of the animal depended on amputation of the injured limb as soon as possible after the removal of the clamping apparatus. This fits in admirably with the point emphasized by Grant and Reeve[2] that in cases of traumatic shock surgical treatment must be carried out as soon as possible after the circulation has been adequately restored. Green further demonstrated that restoration of fluid volume in the rats had by itself little effect in diminishing the mortality rate. Another fact of importance which was elicited was that the animal could survive a very long asphyxia provided that it was induced for short periods separated by intervals. As Green points out, this suggests that some toxic factor produced at the site of injury is in some manner got rid of, provided too large a dose is not suddenly thrown into the circulation.

A comprehensive account is given by Bielschowsky and Green[3] of the methods adopted in isolating and determining the nature of this "myotoxin," and it is concluded that it is adenosine phosphate. Of more immediate importance to the clinician is the effect of this toxic factor on the animal. Injection by any of the parenteral routes causes a rapid fall of blood pressure, progressive weakness, and rapid shallow breathing, followed by slow irregular respirations which precede death. Haemoconcentration is an important feature which is almost certainly associated with the great amount of fluid in the damaged tissues and elsewhere, the marked congestion of liver and great veins, and the haemorrhages into lungs and digestive tract. It is interesting to note that with intraperitoneal administration the lethal dose of the toxic factor is smaller than for other routes—a fact which may be connected with the very large volume of intraperitoneal exudate that is produced. The effect on the kidneys is especially worthy of note. Anuria was always observed even when large amounts of fluid were injected simultaneously, suggesting that the toxic factor had some direct action on the renal cells; and the hypothesis seems worth considering that the permeability of the tubular epithelium is greatly increased, allowing the complete reabsorption of the glomerular filtrate. This view is favoured by the author's impression of pathological changes in the lining cells of both the first and second convolutions. In this context the observation that injection of myohaemoglobin enhances the effect of the toxic factor brings to mind the clinical conditions in which haemoglobinuria is said to play a part in the pathogenesis of anuria. Green displays a natural caution in drawing analogies with the syndrome of shock as seen in man, but it appears justifiable to conclude that the state brought about by the toxic factor is worthy of the designation of shock and that it presents features which are very similar indeed to those presented by the crush syndrome. In any event a new field has been opened to pathologist and pharmacologist, while the clinician's heart is uplifted in the hope that more light is to be thrown on the age-old problem of shock and more help given for its prevention and treatment.

[1] *Lancet*, 1943, **2**, 147.
[2] *British Medical Journal*, 1941, **2**, 293, 329, 332.
[3] *Lancet*, 1943, **2**, 153.

THE HEALTH OF BELFAST

The report for 1942 of the medical officer of health, Dr. C. S. Thomson, though curtailed, gives a comprehensive review of the health of the city of Belfast. The general death rate was only 11.2 per 1,000; during the preceding 20 years the mortality had ranged from 12.9 to 15.6. The birth rate, 21.7 per 1,000, was the largest for eight years. The infant mortality during 1942 was high—92 per 1,000 births. There has been only a very slight improvement in the infant death rate during the past two decades, and this has been masked to some extent by wide annual fluctuations. The range during this period has varied from 78 in 1930 to the appalling figure of 122 in 1940. As a result of such a high infant mortality there were, in 1942, more deaths recorded in the first year of life than in the forty years from age 5 to 45. The causes of infant mortality are not given in the report, but it is evident that an important factor is diarrhoea and enteritis; during the preceding 20 years the highest and lowest mortality from this cause corresponded with the highest and lowest infant mortality. Deaths from diarrhoea and enteritis under 2 years of age numbered 166 in 1942. In contrast to the high infant mortality the rates for maternal mortality and stillbirths were relatively low, being 3.2 and 38 per 1,000 respectively. Mortality from tuberculosis in 1942 fell to the pre-war level following the rise in 1940–1 which interrupted the almost continuous decline of the interwar period. The deaths for 1939–42 were 365, 412, 426, 369 for pulmonary tuberculosis, and 71, 94, 98, 79 for other forms. During the

29 years 1914–42 mortality from respiratory tuberculosis has been more than halved, while mortality from non-pulmonary forms has been reduced by three-quarters. The results of the campaigns against diphtheria and venereal disease are reviewed in the report. For diphtheria the immunization scheme continues to make steady progress, and over 44,590 children have received a course of treatment. The number of children under 15 immunized was 9,506 in 1942 and was 2,150 fewer than in the preceding year. The proportion of the child population under 15 immunized is only about one-third, and less than one-quarter of the pre-school children have had treatment. In 1942 369 cases of diphtheria with 15 deaths were reported, compared with an average for the preceding ten years of 828 and 40. The results obtained under Regulation 33B from its commencement in the spring of 1943 to the end of July, 1943, are stated to be most disappointing, and no headway whatever has been made in the control of venereal disease, which has increased very much lately. Dr. Thomson considers 33B a failure and advocates compulsory notification, and he suggests the immediate adoption of the New York regulations which became law in January, 1918.

PULMONARY ABSCESS

Few parts of the body provide so many pitfalls for the uninitiated surgeon as the thorax, and the treatment of a lung abscess can be one of the most difficult problems in thoracic surgery. A recent exposition by Brock[1 2] of the surgical approach to abscesses in the upper lobes is therefore particularly welcome, and stands out from the vast and diffuse literature of this subject because of the characteristic thoroughness and clarity of its presentation. Brock first describes the anatomy of the bronchi of the upper lobes, showing that the successful drainage of a lung abscess can rarely be achieved without a knowledge of this subject. Comparison of other recent accounts of bronchial anatomy (Foster-Carter[3 4]) with this one shows that there is now substantial agreement about the distribution of the upper-lobe bronchi, including those of the axillary regions, the sole exception being the shape of the broncho-pulmonary segments forming the "lingula" of the left upper lobe. Here Brock considers that the division between the two segments is horizontal rather than vertical. He then emphasizes the importance of accurate location of a lung abscess and describes in detail how this can be achieved. Very careful location is essential in order that drainage may be performed with a minimum of damage to the patient at the site of election—where the abscess is nearest to the chest wall. For instance, the commonest site for a right upper-lobe abscess is the subapical (posterolateral) segment; it is of the utmost importance for the surgeon to determine whether the abscess is situated in the posterior or the lateral subdivision of this segment, because the surgical approach is completely different in the two cases. Failure to recognize these facts results in what Brock calls the "blunderbuss" method of attacking a lung abscess, with multiple rib resections and extensive damage to the chest wall and healthy lung tissue. An adequate knowledge of the complex bronchial supply of the so-called "axillary" areas is also indispensable when locating and draining abscesses of these regions.

In another investigation Brock[5] has confirmed the pioneer work of Koch and Wieck,[6] who showed that the posterior end of the main interlobar fissure on both sides is at a lower level than is commonly supposed. The apex of the lower lobe is rarely higher than the posterior end of the fifth or sixth rib, and consequently an abscess of this area will require drainage by resection of a rib below this level, commonly the eighth rib. Textbook descriptions, on the other hand, would lead one to expect such an abscess to lie above the sixth rib, because the level of the lower-lobe apex is given incorrectly as the third dorsal transverse process.

The experiments of Quinn and Meyer[7] in 1929 showed that lipiodol introduced into the nose during sleep flowed readily into the lungs, and this has been held to support the theory that lung abscesses are due to the inhalation of infected material. Brock, Hodgkiss, and Jones[8] describe with much more precision the exact areas reached by small quantities of iodized oil introduced into the trachea with the subject in various positions. It is significant that, when the patient lies on his back, the oil flows into the subapical (posterolateral) segment of the right upper lobe and into the apical (dorsal) segments of the lower lobes. When the subject lies on his side the oil gravitates, as would be expected, into some part of the "axillary" region of the dependent upper lobe. These areas are the commonest sites for the occurrence of a lung abscess, and the authors conclude that most pulmonary abscesses are caused by the inhalation of infected material during sleep or anaesthesia. They state also that the lesions of pulmonary tuberculosis commonly affect the same areas, and suggest that these too are the result of bronchial embolism. Without underestimating the value of these experiments, it is still important to preserve an open mind on this subject, remembering that other theories, also supported by experimental evidence, have been advanced. The distribution of the pulmonary artery is very like that of the bronchi, but it has not yet been studied so extensively. The experiments of Cutler[9] on the production of lung abscess and of Chien-Liang Hsu[10] on the formation of tuberculous lesions, to mention only two examples, suggest that infected vascular emboli may also be a factor in the pathogenesis of pulmonary infections. It is therefore unjustifiable to adopt a dogmatic attitude towards this problem at the present time, but in many cases of lung abscess the evidence appears to favour an aspiration origin.

EXTENSION AT ROEHAMPTON

An extension of the limb-fitting centre at Queen Mary's (Roehampton) Hospital was opened recently by Dr. Wellington Koo, the Chinese Ambassador in London. The extension includes a spacious demonstration theatre, with annexes, and is equipped with cinematograph apparatus, for lectures and classes on the science of limb-fitting. This follows upon a resolve of the governors, largely at the instigation of one of them, Kathleen, Viscountess Falmouth, to bring the facilities at Roehampton to the attention of the representatives of the various Allied Governments now in this country. In this way we may hope that the knowledge and experience gained at Roehampton will become widely available in European countries after the war. A number of new workshops have also been built with a view to dealing with the many limbless cases which are the result not only of war but of injuries in industry and transport. In a graceful little speech in the new demonstration theatre Dr. Wellington Koo said that Roehampton furnished a fascinating story of successful endeavour in practically a new field of service to humanity. He handed the key of the extension

1 *Guy's Hosp. Rep.*, 1942, **91**, 111.
2 Ibid., 1943, **92**, 26.
3 *Brit. J. Tuberc.*, 1942, **36**, 19.
4 *Proc. roy. Soc. Med.*, 1943, **36**, 451.
5 *Guy's Hosp. Rep.*, 1942, **91**, 140.
6 *Anatomische Analyse des Röntgenbildschattens des Herzens und der Interlobärspalten des Lungen*, Jena, 1930.
7 *Arch. Otolaryngol.*, 1929, **10**, 152.
8 *Guy's Hosp. Rep.*, 1942, **91**, 131.
9 *Amer. J. Dis. Child.* 1929, **38**, 683.
10 *Amer. Rev. Tuberc.*, 1938, **38**, 162.

(made in duralumin, the same metal as that in which the artificial limbs are constructed) to Sir Walter Womersley, Minister of Pensions, who said that numbers of medical men from the Allied nations had already attended at Roehampton, and in the factories some Polish nationals were actually being trained in limb construction with a view to starting a factory under Government auspices at Warsaw on their return. He added that in the extension post-graduate courses would be provided for medical men from this country as well as from abroad, and training would be given to medical auxiliaries and to women who wished to learn the technique of nursing amputation cases. It was hoped also that Roehampton would be the scene of surgical conventions. A film of the work was shown, and a demonstration was given by patients so adept that one realized with difficulty that they were wearing an artificial limb at all.

SMALLPOX: A WARNING

On Feb. 6 a military patient from the Middle East was admitted to the Mount Vernon Emergency Hospital, near Rickmansworth. He had been vaccinated successfully in infancy and again two years ago. After a few days he had what was regarded by competent medical officers as measles and chicken-pox, and the true nature of the condition was not found out until an unvaccinated nurse who had been in attendance on him, and an unvaccinated visitor to the ward in which he was, developed confluent haemorrhagic smallpox. Both these patients died. Subsequently, four vaccinated nurses developed modified smallpox and had much the same manifestations as the primary case; all are mild cases of the disease. A 52-year-old patient, vaccinated as an infant, died from a severe attack. He was in a ward next to that in which the primary case occurred, the staff being common to the two. All the cases were confined to a small division of the hospital, and, so far as is practicable, all recent contacts have been traced and vaccination or re-vaccination offered. It has, however, not been possible to trace a large number of visitors to the hospital, and practitioners are asked to bear this in mind when called in to see doubtful cases. The strain of virus is intensely virulent, but is obviously so susceptible to vaccination as to obscure the classical picture and make diagnosis difficult. The possibility of diffusion cannot be disregarded, and practitioners and medical officers of health are reminded of the assistance in diagnosis which is available from the medical staff of the Ministry of Health, both regional and central, and from the London County Council.

THERAPEUTIC ABORTION IN SWITZERLAND

English gynaecologists are familiar with the problem of how far therapeutic abortion is permitted by law. Mr. Aleck Bourne's case[1] brought a little light in Mr. Justice Macnaghten's instruction to the jury, where his lordship stated that pregnancy may lawfully be terminated to save the mother's life, and that "life" includes not only survival but also a reasonable prospect of health. Medical speakers have from time to time demanded that Parliament should give some protection to the qualified medical man who terminates pregnancy in good faith for the protection of his patient's health. The Swiss legislature actually passed a law of this kind in 1941,[2] but it does not seem to have entirely simplified the position; in fact, Dr. Alfred Labhardt has explained[3] at some length the new medico-legal problems which it raises. It provides that a qualified medical practitioner may lawfully intervene if a number of conditions are satisfied. The doctor must be in actual practice, and the patient must consent in writing (the husband's consent is not required). The reason for the operation must be medical: the immunity does not extend to social, legal, or eugenic grounds. Intervention is justifiable only if the disorder for which it is undertaken directly menaces life or involves great danger of severe and lasting injury to health, and if the danger cannot be averted in any other way. The necessity must be confirmed by a second medical practitioner, who must be a specialist in the disease for which the operation is considered. Dr. Labhardt observes that this is the first time the standing of a specialist has been recognized in a Swiss statute, and says the profession had to fight hard to get it inserted. The specialist is named by a specially appointed authority of the canton—in Basle the chief medical officer—from a panel submitted by the representative professional body.

In towns where several specialists are available the patient's doctor may choose his second opinion; if one specialist does not agree with him he may call in another, but he must disclose the opinion of the first. Differences of opinion may be resolved in consultation with the head of the specialty. The State has no further part in the operation, and professional secrecy is fully maintained. The second opinion must be given in writing after an exhaustive study of the history and personal examination, and must go fully into the prognosis, the need for the operation, and the possibility of using other methods. The specialist must certify in the exact words of the statute the existence of a danger to life that cannot otherwise be averted, or of a great danger of severe and lasting injury to health. The specialist, the patient's doctor, and the operator should, Dr. Labhardt recommends, each keep a copy for at least five years, together with a copy of the patient's form of consent. The second opinion may be dispensed with in an emergency—e.g., in rural practice or on the operating table—but the circumstances must be reported within 24 hours to the health department of the canton. A doctor who intervenes for reasons, however weighty, that are not strictly therapeutic is not exempt from punishment, but the court may take them into account in deciding the penalty. (In England, where no minimum penalty is laid down except for murder, the court could do this without a statutory provision.) Dr. Labhardt thinks, nevertheless, that non-medical grounds should be dealt with in the specialist's written opinion. He also feels strongly that a doctor called in to terminate pregnancy after a formal opinion has been given in favour of intervention should thoroughly investigate the case himself and not rely blindly on the opinion. It is therefore desirable that the chief surgeon of the clinic or department where the operation would be performed should take part in the consultation at which the intervention is discussed, so that he will not have to refuse at the last moment.

Most Swiss gynaecologists probably agree with Dr. Labhardt that the new law substantially improves their position. It enacts in precise statutory form very much the same principles as Mr. Justice Macnaghten enunciated in the Bourne case. The policy in this country, on the contrary, has been deliberately to avoid precision and to trust the integrity of the medical profession to observe loyally a largely unwritten law. The Bourne case so far satisfied the advocates of precision that they have not since made a concerted demand for legislation. Our professional honour is perhaps better served by Mr. Justice Macnaghten's sympathetic statement on what we may do than it would be by a cold statutory formulation of what we may not.

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[1] *British Medical Journal*, 1938, **2**, 199.
[2] Swiss Penal Code, Arts. 120–1, Jan. 1, 1942.
[3] *Schweiz. med. Wschr.*, 1943, **73**, 20.

The Council of the B.M.A. at its meeting on March 3 appointed Dr. Charles Hill to the vacant post of Secretary of the Association.

MR. CHURCHILL WITH THE PHYSICIANS

The Prime Minister was the principal guest at a luncheon party given on March 2 by the Royal College of Physicians of London. There were two speeches, one by the President (Lord Moran), who proposed the health of the guests, and Mr. Churchill, who in his reply gave the toast of "The College."

Science, Action, and Character

Lord MORAN, in the course of his speech, said:

"I was under the impression that my wanderings were a new chapter in the long history of the College, but the annals are full of the travels of my predecessors—to the Court of France, to the Low Countries, and to Spain. . . . It is perhaps inevitable, having spent so many hours in the ante-chamber of Councils of War, that I have come to compare the profession of medicine and the profession of arms. Progress in both professions has always come by jumps punctuated by long periods of stagnation. . . . In comparing the professions one asks whether the same qualities are needed in both. For some years now I have come much into contact with soldiers, and as a doctor I see no reason to believe that the scientific mind is more common in my calling than in the Army. At any rate, that is true if I am speaking of practising physicians and surgeons. I hasten to add that qualification, for there are half a dozen creative minds in the profession of medicine who have no counterpart in the Army—Sherrington, Adrian, Dale, Gowland Hopkins, Thomas Lewis, Almroth Wright, all Fellows of our College. There is, too, no machinery in that Service like the Medical Research Council for the discovery of men with a creative instinct at the outset of their careers. Such men would carry out research into tactics and weapons—for example, the limitations of the anti-tank rifle would have been laid down before it was used in battle. But I am not sure if the conditions of the two professions are strictly comparable. I doubt whether the direction of armies in war calls for the creative instinct in the same measure as does research into the origin of disease. . . . There is one other qualification I must make. I am bound to ask if the conditions of the soldier's life and training are friendly to the development of the scientific mind. Discipline does not foster independence of thought, while life in a regimental mess hardly encourages those habits of reflection that are only bred in solitude. Further, there is the fetish, not confined to soldiers, that the mind works best when the body is exhausted by exercise.

"There is one quality which both callings need. The first and the last essential of an efficient soldier is character; without it he will not long endure the perils of modern war. Even in the last war the durability of a general—his survival value—seemed to depend more on character than on capacity. We may doubt the pre-eminence of Foch, Haig, Jellicoe, and Trenchard in their art, but as men they came from the old mould of their race. They wore well, they were built for great occasions. In the fundamental clash between great nations when their existence is at stake the issue is determined by moral and not by intellectual factors. The part that character plays in medical diagnosis is not always appreciated. It is the quality which allows judgment to be exercised irrespective of worldly considerations which may snare the feet of the lighter breed of doctor. I end my comparison with a paradox. The successful doctor sees a stranger almost every hour of the day, and he must not only find out what is wrong with him but must learn to gauge his temperament and his outlook, what he wants to know and whether he is going to do what you tell him, and so the physician, after 30 or 40 years, becomes an expert judge of men, but he cannot use it in devoluting his work. He must exercise his lonely art as an individual. Now the soldier who has not the art of selecting his subordinates is lost, but it is the paradox of the situation that, unlike the physician, he gets few opportunities in peacetime of practising this art. Even individual criticism is discouraged in the mess."

Lord Moran ended with a glowing tribute to Mr. Churchill, measuring his contribution to victory by attempting to define more precisely than had been done the exact nature of his task. That task as he saw it was the moral preparation of the youth of England for ordeal by battle. The art of command was the art of impressing the imagination. When the surge and thunder of the Prime Minister's vast vocabulary were heard no more history would recount how he spread abroad a sense of purpose and direction which gave men hope when there was really none. "More than once I have been with him when news of shattering reverses was brought to him, and in my heart I have come to think of him as invincible."

The Government's Health Policy

The PRIME MINISTER, who was received with loud cheers, began by thanking his cherished friend, Lord Moran, for all the kind expressions he had used about him. After speaking of some remarkable and inspiring recent advances in medicine, he said that the discoveries of healing science must be the inheritance of all. Disease must be attacked, whether it occurred in the poorest or the richest man or woman, simply on the ground that it was the enemy. The Government had adopted the policy outlined in the words of Lord Beaconsfield on health and the laws of health, and that was the course upon which it had embarked.

"Our policy," said Mr. Churchill, "is to create a national health service in order to ensure that everybody in the country, irrespective of means, age, sex, or occupation, shall have equal opportunities to benefit from the best and most up-to-date medical and allied services available. The plan that we have put forward is a very large-scale plan, and in ordinary times of peace would rivet and dominate the attention of the whole country; but even during this war it deserves the close study and thought of all who can spare themselves from other duties for that purpose. We welcome constructive criticism; we claim the loyal and active aid of the whole medical profession. Any health services must rest on two arches: the first, the general practitioner, the rank and file of the profession; the second, the hospital service, depending upon the staffs of the hospitals, sustained and guided by the consultants.

"The fact that many more consultants will be needed in the future than there are now must not result in dilution or in the lowering of the standard of consultant work. There is a new gap to be filled, and in this new effort the Colleges must play their great part. We ask your aid: we invite your counsel. Tackling together these vast problems we may take a forward movement which will be notable and permanent in its effects long after the roar of cannonade has died away. We have to-day announced the names of the Royal Commission on Population. There is no branch of human knowledge in which we can pierce the mysteries of the future so clearly as in the trend of population. Here you have prophecies which rest on certainty; here the searchlight of statistics ranges with accuracy for 30 or 40 years ahead. The destiny of our country, which after all has rendered notable services to mankind in peace and latterly in war, depends upon an ever-flowing fountain of healthy children, born into what we trust will be a broader society and a less distracted world. Science, now so largely perverted to destruction, must raise its glittering shield not only over the children but over the mothers, not only over the family but over the home. In all this field again you must be active. Your services will be given with devotion and your voice will be heard with respect.

"This College must play its part in keeping alive the historic tradition of the medical profession, and must ever foster those high standards of professional behaviour which distinguish a profession from a trade. This is what you have tried to do as an institution for 400 years. I confess myself to be a great admirer of tradition. The longer you can look back the further you can look forward. The wider the span, the longer the continuity, the greater is the sense of duty in individual men and women, each contributing their brief life's work to the preservation and progress of the land in which they live, of the society of which they are members, and the world of which they are the servants."

Infant mortality in Belgium per 1,000 live births was 81.3 in 1939, 93.2 in 1940, 92.3 in 1941, and 96 in 1942 (*Arch. méd. belges*, 1943, **96**, 1). The nutritional condition of children under one year in 1941 and the first half of 1942 was still satisfactory. Diseases are not commoner than formerly except for slight traces of rickets, which occur even in breast-fed children. Altogether 62% of children are breast-fed. Usually, after the third month, only 25% are still breast-fed.

Reports of Societies

THE R.A.F. MEDICAL SERVICES AND THEIR CONTRIBUTION TO THE WAR EFFORT

At a meeting of the Medical Society of London on Feb. 14 Air Marshal Sir HAROLD WHITTINGHAM, Director-General of Medical Services, R.A.F., lectured on the contribution which that service had made to the war, as regards selection of personnel, prevention of disease, treatment of sick and injured, rehabilitation, transport of casualties by air, and the maintenance and improvement of physical and operational efficiency.

Selection Tests

He dealt first with the selection tests for pilots and others. A new hearing test, using a pure-tone audiometer with a noise background simulating the noise experienced in aircraft, had been devised with a view to replacing or reinforcing the 20-ft. whisper test. As for visual tests, some maintained that as the pilot flew by instruments at night no night visual standards were necessary. On the other hand, the pilot might be compelled to land on a strange airfield after a long flight over the Continent, or to land even on a familiar airfield when intruder aircraft were about, and he might experience crowding over the target. The possibility of taxi-ing accidents was doubled at night. Therefore tests and standards for night vision seemed to be necessary. There were also clinical tests for cardiovascular stability in selecting pilots suitable for aerobatics. Those who had a low blood pressure and showed no rise in the diastolic blood pressure in change from the horizontal to the vertical on the tilt table were usually rejected. The Navy was the first Service to adopt mass radiography, but the R.A.F. was the first to use mobile units for this purpose. Since 1941 over 400,000 such examinations had been carried out. Among those examined 2.8 per 1,000 males and 3.6 per 1,000 females were found to have active tuberculosis.

Maintenance of Efficiency and Disease Prevention

Sir Harold Whittingham next spoke of the maintenance of flying efficiency. One innovation was the flying personnel medical officer. A number of medical officers had their wings and flew with the men, or piloted aircraft themselves, making observations and linking up with the research team. Some of these officers were sent abroad to the different fronts to study special flying problems from the point of view of human efficiency.

Turning to prevention of disease, he showed a chart illustrating the striking improvement in the health of the R.A.F.. The Force was now at the healthiest point in its history in either peace or war. In this respect a 25% improvement was shown in 1941 over 1940, and again in 1942 over 1941, but in 1943 the improvement was only 10%, simply because the position was now so good that the scope for improvement was restricted. A team studied dietetics and assessment of food values. The general instruction was that diet must not be modified in such a way as to increase transport or financial outlay, though now and again some vitamin deficiency was revealed and it was necessary to send special foodstuffs. At Malta during the siege some men suffered from night blindness, which persisted in spite of extra doses of vitamins A and C, but within a week of a surfeit of oranges becoming available night vision went back to normal, suggesting that some factor essential for good night vision is present in oranges. Dental hygienists were now for the first time introduced into the R.A.F.—a quite considerable body of them—and were doing first-class work in scaling and polishing teeth as well as instructing air men and women how to care for their teeth. The breakdown rate from nervous conditions had proved extremely small.

Evacuation of Casualties by Air

With regard to the evacuation of casualties by air Sir Harold Whittingham said that the R.A.F. had transported about 28,000 sick and wounded during hostilities in the Mediterranean war zone, including a number from North Africa to the United Kingdom. As was to be expected, Army cases greatly preponderated.

Hospital Provision

Hospital provision included specialist centres such as those for plastic surgery, the treatment of burns (specially equipped with brine baths), and orthopaedics. The R.A.F. mobile field hospital usually consisted of 100 beds, expansible to 200 by means of stretchers. The hospital packed up entirely into 28 vehicles, and in the Western zone one was supplied for each 10,000 personnel. In tropical and subtropical zones the provision was one to every 5,000 personnel. He described the flying surgical section—which was in Sicily on the second day of the invasion—and the special scheme for the collection of casualties and sea rescue. To discover the best method of effecting sea rescue of disabled and unconscious men, one medical officer had himself anaesthetized and thrown repeatedly into a swimming bath. The result was an improvement in the design of the "Mae West jacket," but it cost the medical officer four days in hospital afterwards on account of the exposure.

Rehabilitation

A first-class system of rehabilitation in the Royal Air Force was started during the Battle of Britain in 1940 and had since been extended and was in practice on every front. A large number of rehabilitation orderlies were employed to see that the necessary exercises, beginning in the hospital, were carried out. Cases were sent from hospital to rehabilitation centres so designed as to remove any hospital atmosphere for psychological reasons. Each patient was required to be taught to walk properly from the beginning, otherwise he acquired a limp; he was taught to walk up and down steps; and finally to jump 10 feet into a sand pit to simulate landing after a parachute jump. Among fracture cases 82% were got back to full flying duty; among burns, about 80%; and among nervous cases, 46%, although approximately 80% of the last group got back to flying duty of some sort.

Oxygen Supply

Air Marshal Whittingham said that the R.A.F. physiologists, in the early days of the war, designed an oxygen installation that was more than twice as efficient as the then existing set. This played an important part in helping pilots to gain mastery of the Luftwaffe in the Battle of Britain. Thus at 20,000 ft., if a flier was not getting oxygen, he became unconscious, if walking about, within 5 minutes, and at 25,000 ft., if sitting still, he became unconscious in 7 minutes. Without oxygen at 30,000 ft. he became unconscious in 2½ minutes and died in 15 minutes, and at 40,000 ft. became unconscious in half a minute and died within 5 or 10 minutes. Even at 10,000 ft., if oxygen were not taken, some effect was noticeable. Lack of oxygen produced symptoms resembling those of drunkenness; the man "felt himself to be at the top of the world, while every minute he was slipping under the table." The lecturer recalled that once on a flight from Iceland he wrote a paper during the voyage, and thought he had written it extremely well, only to find afterwards that it was ridiculous nonsense. The flight was at just over 12,000 ft. At 15,000 ft. there were visual disturbances and at 18,000 ft. hearing started to suffer; one suddenly realized that one was not hearing the engine. It had been necessary to indoctrinate air crews as regards their need for oxygen. He described and illustrated the oxygen apparatus and also the experimental chambers in which altitude pressures up to 70,000 ft. could be simulated.

Other Precautions

Finally Sir Harold Whittingham described the measures taken to deal with what was known as "bends"—a condition in which nitrogen bubbles formed in the blood and tissues, and various symptoms such as disabling pains in the joints, spots in front of the eyes, and a choking feeling were experienced. Only 10% of fit air crews under the age of 28 suffered from bends. The trouble was overcome largely by careful selection of personnel for special duties. Frost-bite had practically ceased to exist in the Air Force. Out of over 12,000 man-sorties there was only one case of frost-bite, and that was usually due to the negligence on the part of the individual. Improvements in the heating of aircraft had decreased the incidence of frost-bite tenfold in 4 years. Blacking-out occurred, not on account of speed but of changes in speed. Its avoidance was partly ensured by posture, so as to lessen the pooling of blood in the most

dependent parts, and by ensuring a high degree of physical fitness, including abstinence from alcohol and tobacco. Researches in connexion with altitude flying, explosive decompression, baling out from stratosphere heights, "blacking-out," cold, and night vision, including the counteracting of searchlight glare, had materially helped our aviators both in the Battle of Britain and that of Berlin. He ended with a high tribute to the medical officers, professional, scientific, and executive, who had built up a medical service which he felt was second to none.

Lord MORAN, P.R.C.P., in proposing a vote of thanks to Sir Harold Whittingham, said that the greatest contribution the medical services had made to the R.A.F. was in the elimination of fear, since it was fear which paralysed the will power and lowered the morale.

ENURESIS

A meeting of the Section of Urology of the Royal Society of Medicine was held on Feb. 24, with Mr. E. W. RICHES in the chair, to discuss enuresis.

Mr. T. TWISTINGTON HIGGINS said that enuresis was a symptom, not a disease. It was defined by Meredith Campbell as "the involuntary and usually unconscious voiding of large amounts of urine which occurs predominantly during sleep in the absence of organic disease of the nervous or urological system." The word "unconscious" seemed to exclude children who were deliberately dirty in their habits; these could not be excluded. The definition made no mention of age, but enuresis should not be spoken of until the child was 3½ or 4 years old. The ordinary healthy infant properly trained might be expected to be dry at 18 months, and if between that age and 3 the child was perpetually flooding, something was likely to be wrong. Spina bifida occulta must be considered. If the spines of all children were examined by *x* rays a proportion—estimated by some authorities to be 35%—would be found to have fusion defects, and, particularly if these were in the sacral area, spina bifida occulta might be the cause of enuresis. Approximately one case in ten would be found to have some organic disease of the urinary tract. The urinary tract lesions to be expected were almost all due to obstruction in the tract or infection, or a combination of the two. Careful examination should also be made of the external genitals. In girls vulvovaginitis was the commonest lesion. In boys the state of the external urinary meatus should be noted to ascertain whether it was contracted, ulcerated, or misplaced. One of the many traditions about the prepuce was that it must be amputated to stop bed-wetting, but he had never seen a prepuce, however tight, concerning which he was satisfied that it was a cause of urinary obstruction. Circumcision had no place in the treatment of enuresis. The condition of the bladder and the question of residual urine should be taken into account; a complete urine analysis should also be made. If this preliminary examination indicated a urological basis for the enuresis the child should come under treatment by the urologist, but if nothing abnormal was revealed the enuresis might be assumed to be functional. For functional enuresis institutional treatment of the proper type was invaluable, but not all children with bed-wetting could or should be treated in an institution. Sociological implications could not be ignored. The remedy was in better and securer homes and more intelligent, wiser, and less harassed parents.

Mr. H. P. WINSBURY WHITE said that during wartime a great increase in this condition was to be found in males, especially adolescent and adult males. He mentioned the value, after excluding extra-urinary conditions, of dilating the contracted urethra. As such dilatations would often have to be repeated it was wise to make this perfectly clear at the outset. The minimum period between dilatations should be one month. Prolongation of the individual treatment by the use of the indwelling catheter for half an hour, and its removal before the patient wakened from the anaesthetic, could be carried out in certain cases. Chronic frequency of micturition when present usually improved quickly from dilatation.

A Classification of Cases

Dr. W. SHELDON, as a practising paediatrician, said that enuresis was by no means confined to the poorer sections of the community; it was found in all social grades. In young children it was equally divided between the sexes; in the second half of childhood it was more common in boys than girls. Among 5,000 children aged between 5 and 10, and living in L.C.C. institutions, the incidence of enuresis was 5%. The classification he had found useful was: (1) cases associated with organic disease of urinary tract; (2) cases associated with disorder of health in some other system of the body; (3) cases associated with mental retardation; (4) functional enuresis persisting from infancy or reappearing in later years. In the first group there was usually diurnal as well as nocturnal enuresis or very great frequency of micturition. He had yet to see a boy whose enuresis could justly be attributed to phimosis. In the second group many conditions might act as contributory factors, including disorders of the alimentary tract. Adenoid enlargement causing snoring and disturbance of sleep should be considered. He would reserve ephedrine for the treatment of enuretics whose condition was associated with allergic rhinitis. The use of drugs in the third group was universally disappointing. Something might be done with children in this group by bribery in return for a dry bed. In the fourth group it was useful to withhold fluid after tea and forgo any meal at bedtime; also to see that the child made a real effort to empty the bladder before going to bed, and was roused again after four hours to pass water. The attitude of the home must be encouraging. Praise for a dry night was better than scolding for a wet one. The raising of the bed so that the hips were above the level of the shoulders was sometimes useful. There was another group consisting of sensitive and intelligent children, who stood particularly in need of sympathy and encouragement; and, lastly, there was a small group of enuretics whom the war had brought into notice—those who intentionally wetted the bed to gain some advantage, such as transference to a fresh billet.

Dr. E. B. STRAUSS considered that enuresis belonged to psychiatry more than to urology. There was an atavistic pull-back to the original watery environment of the race. Another important factor was the extreme sensitiveness of the kidneys and bladder to emotional stimuli. He doubted whether spina bifida occulta was found more often among enuretics than among those who had developed normal bladder control. When pills and potions effected a cure they worked through their suggestive rather than their pharmacological properties. He had treated a group of children with a belladonna and potassium citrate mixture and a control group with burnt sugar only, and had got the same proportion of cures in both. Secondary enuresis might respond well to hypnotic suggestion. Mr. E. W. RICHES said that the finding of spinal fusion defects in a child with enuresis was not to be taken as an assumption that the defect was the cause of the enuresis. It was an indication for further investigation, which should be carried out with the cystogram and the cystometrogram. By these means, with cystoscopy of course, it was possible to discover which bladders showed signs of disturbance of nerve function. If these cases were left he was sure that they would go in progressive stages to the complete incontinence of senility.

Wing Cmdr. J. C. AINSWORTH DAVIES found that indigestion was an important exciting cause. He had seen enuresis associated with gastric and duodenal ulcer, and when the ulcer improved the enuresis cleared up. One way to distinguish the malingerer from the true incontinent was, on applying the urethroscope and fixing the floor of the internal meatus, to watch the roof, which ordinarily could not be seen unless the urethroscope was pulled right down to an angle of more than 45 degrees. If, however, the roof simply flapped into view he thought the case was likely to be one of true incontinence—that is to say, a relaxed internal sphincter. He also raised the question of the possibility of plastic operations. Mr. F. McG. LOUGHNANE said that he had had no experience of operating for enuresis. In examining these children with the cystoscope he had never found an abnormality in the bladder or neck of the bladder. If the children were of the age of about 12 he used the cystoscope without giving any local anaesthetic, and in a large number of these cases, whether as the result of suggestion or not, they did get better quickly. One of the most disappointing patients was a boy who at the age of about 14 was at a public school, where the matron was always holding him up as a bad boy on account of this habit. He had no abnormality. The speaker saw the boy when he was about 18 and sent him to a psychiatrist, who said that he had a fear complex which would take a very long time to resolve. He believed psychiatry to be indicated more than surgery in the treatment of these cases.

The Council of the Association of Clinical Pathologists prepared a draft memorandum in September, 1943, on a National Service in Clinical Pathology, and this was approved by a general meeting held on Jan. 28, 1944. The memorandum begins by stating that it seems likely that the national medical service of the future will be organized upon a regional basis, permitting a considerable degree of local autonomy within a framework set up by central authority. "Pathology is an integral and indissociable part of medicine, and as such must participate in any general reconstruction of the whole." Discussing pathology in relation to practical medicine, it says that public health or environmental pathology must continue to be the concern of Governmental bodies. Clinical pathology is the affair of those engaged in the diagnosis and treatment of sickness in the individual, and this latter branch of pathology, being the field of the Association of Clinical Pathologists, is the main subject of the memorandum. The views of the Association are then put forward under eight heads: scope of a national service, organization, attendance of patients at laboratories, domiciliary service, special clinics, status of clinical pathologists, blood transfusion service, and post-mortem service. The hon. secretary is Dr. W. H. McMenemey, Pathological Department, Royal Infirmary, Worcester.

Correspondence

Haemolytic Disease of the Newborn

SIR,—I have read with great interest the annotation in your issue of Feb. 19 on the eugenic and genetic aspects of the Rh factor, but I wonder whether the concluding statement that this genetic research has led "to the chance of timely recognition of a great danger and thus to prompt and successful treatment" is not too optimistic, since, although prompt treatment by injection of Rh-negative blood has improved the immediate prognosis, there is as yet no evidence that it will prevent the development of those dread sequelae of hamolytic disease of the newborn—kernicterus, cirrhosis of the liver, and (possibly) polyostic fibrous dysplasia.

It has been suggested that the danger of kernicterus is diminished if transfusion is carried out early, but in infants suffering from icterus gravis and hydrops foetalis we do not know for how long before birth the haemolytic process has been going on. Recently my colleague Dr. Baar has, as Haldane suggested, estimated the anti-Rh agglutinins in a pregnant Rh-negative woman—one of whose previous children had died from icterus gravis—and found that a marked increase in the titre of the agglutinins occurred at the seventh month. This observation suggests that destruction of the foetal blood began two months before the termination of the pregnancy. The occurrence of hydrops foetalis and the importance of haemolytic disease in the production of stillbirths are evidence that the disease may have such a long intra-uterine course that treatment will not be universally successful; moreover, since cirrhosis of the liver has been found in stillbirths which show evidence of haemolytic disease it is clear that cirrhosis may be present when the child is born alive. Possibly kernicterus might be prevented if labour were induced or Caesarean section done at the time when the great increase in the titre of anti-Rh agglutinins in the mother's blood occurs; but in the case already mentioned this would have meant the added risk to life of such a degree of prematurity that the child might be almost classed as non-viable. Actually this mother was allowed to go to term and an exsanguination transfusion with Rh-negative blood carried out on the infant within a few hours of birth.

It may be thought that kernicterus is so rare that its occurrence may be discounted, but it is only necessary to see one case to realize that, until this complication can be prevented, the ultimate prognosis of icterus gravis can never be regarded light-heartedly however successful its immediate treatment may be. In the past, when attention was only paid to ABO grouping in transfusion, its incidence has been about 8 to 10%. There are certain symptoms—excessive somnolence, convulsions, and a high-pitched cry—which suggest the occurrence of kernicterus, and if these are present I believe it is better to leave the child untreated in the hope that it will not survive.—I am, etc.,

Birmingham. LEONARD G. PARSONS.

Control of Pharmacological Products

SIR,—The plea made by Mr. Robert Taylor (Feb. 26, p. 307) for a control of pharmacological products deserves a wider publicity and the support of our representative medical councils. He exposes the technique by which manufacturing chemists select a product possessing a specific therapeutic action, modify the formula in a small way, and exhibit the newer design under a fancy name. Taylor sees signs of this exploitation, so obvious in the case of barbiturates, being applied to the sulphonamides. How much longer is the medical profession to tolerate and condone this travesty of scientific therapeutics? When a certain digitaline pill gained a reputation in the treatment of heart failure, eight other manufacturing chemists prepared a digitaline product. A controlled clinical trial of these separate brands having the same distinctive colour and the same peculiar dosage showed a wide and unsafe variation in their therapeutic effects. Another miscarriage of our scientific aims in treatment is instanced by the many remedies recommended for angina pectoris and high blood pressure. The merits of such potions are exalted in the daily press, on the backs of motor-buses, and even on the interleaves of medical journals. The Therapeutic Trials Committee of the Medical Research Council undertakes to test remedies submitted voluntarily by any drug house, but there is a need for a medical research tribunal which would control *all* proprietary preparations and release none for therapeutic purposes until a beneficial action has been established after clinical trial.

In the evaluation of a remedy three postulates should be accepted as forming a statutory standard of efficiency. First, the drug must retard the progress of a disease and/or relieve its symptoms. Secondly, it must show this specific action consistently and in the majority of patients, and in this way demonstrate an effect distinct from and superior to that which might take place as a natural periodic variation in the course of the disease in the absence of treatment or during placebo therapy. Thirdly, it must produce its beneficial effects without toxic symptoms. Not until the Ministry of Health invests such powers in a medical research tribunal will the haphazard selection of medicines for our patients give way to therapeutics founded soundly on scientific assay.—I am, etc.,

London, W.1. WILLIAM EVANS.

Functions of Industrial Medical Service

SIR,—In answer to Dr. D. Kenwyn Harris's excellent letter (Feb. 26, p. 304), we are sorry that we did not make the question he raises clear beyond doubt in our article.

We work in the most intimate manner with local practitioners, the public health department, and the local hospitals. As soon as any patient presents herself to the medical department of the factory she is referred either to her own doctor or, if she so desires, to the works clinic. The patient's wishes are the only consideration. If she chooses the works clinic she is first examined and then referred to her own doctor with a covering letter giving full details of findings and suggesting a line of treatment. With the approval of the doctor, who is usually relieved that we will undertake the routine work on his behalf, the patient is then supervised by the clinic, treated if necessary, and booked for hospital, evacuation centre, etc., according to her choice.

Exactly similar methods are employed for gynaecological cases. We emphasize that only treatment of industrial conditions and emergencies is carried out without the approval of (1) the patient, (2) the patient's doctor, (3) the hospital or clinic, or (4) the public health authority, as the case may be. Perhaps we have been fortunate, but the relations existing between all the above and ourselves are of the most cordial nature. The last sentence of Dr. Harris's letter expresses the feelings we had in the matter until recently, but our investigations have convinced us of the need for assisting gynaecological cases, especially where the demand for labour for vital purposes made it essential to keep "all hands on deck."—We are, etc.,

J. V. O'SULLIVAN.
London, N.5. L. B. BOURNE.

Physics in Medicine

SIR,—I am sorry if Dr. Mumford finds that my letter on emulsions is a criticism of dermatologists or of those who dare to sign prescriptions. The intention was to draw attention to certain facts which might, perhaps, give a better explanation of what happens in practice. Adsorption phenomena are of such general daily application that we are apt to overlook the science in it. Little is really known of the manner in which medicaments get into tissues, unless we are satisfied with phrases which are quite correct but are only general statements. Indeed, the recent paper by Linnell and Thomson (Nov. 6, 1943, p. 572) shows that there is doubt whether some of the drugs commonly used have any effect at all. We know that thallium salts will cause every hair to drop out (provided that the patient survives), but there is no real knowledge of how or why it does so. Quinine has been used for some centuries, and we rely on it to a great extent for controlling the worst disease known to mankind.

Much work has been done on it and the literature is very great, yet we are still completely ignorant of how or why it acts, and there is even considerable doubt exactly where it exerts its influence. Opium has come down to us from the ancients, and we still do not know how or why morphine affects some cells more than others, why there is that special selection: only the general statement that it affects metabolism of those particular cells.

As to the "physical rules governing such contact" modern textbooks deal with that subject and many individual papers are concerned with it. The best-known and commonest example is the function of the red blood cells, where it is recognized that physical properties play an important part. It is known that Donnan's equilibrium theory holds, but the details are obscure. Much the same is true of botanical physiology. Again, speaking generally, the blood may carry the same materials to adjacent tissue cells, yet each cell may select different substances from it. But this general statement is not true if one goes into details, for the "blood" does not usually supply tissue cells *directly*—never in the skin—only in certain cases. More usually most cells of the body rely on serum extravasated and make their selection from that serum. All cutaneous cells do so, but we do not know how or why the cells make such selection. The most probable explanation is a physical one. We do know that the extravasation is due to physical conditions—*p*H, etc.—but I have heard no explanation of how or why it acts.

The truth is that most of us (and I am one) are so ignorant of mathematics that we tend to take refuge in denying and decrying the whole thing. It is the easiest way out. I am one of the antiquated group who are trying to creep out of that pit of stagnation; and it is just that effort which makes me realize how much I miss and to what extent medicine, even the practice of it, fails or lacks simply because we funk the dx/dy business, de Moivres's theorem, and so on. And the interesting thing is that there does not seem to be any actual necessity to know about dx/dy, the square root of minus one, the squiggles used, so long as medicine accepts the deductions made by the physicists. To me the real interest in Dr. Mumford's letter is that it indicates how strong is the repugnance to getting out of a groove, even among dermatologists. If only it were realized what a great field is open in this direction, and also how useful it might be in practice, we should soon get more knowledge on the "physical rules governing contact." There is no necessity for any physical chemist "to arise," for there are many at work, though there are too few of them, but very few practitioners who dare to consider them, far less to attempt to apply them in practice. —I am, etc.,

Kingston Hill, Surrey. W. F. COOPER.

Tonsillectomy in Children

SIR,—Mr. E. Carew-Shaw writes that there is a "small minority" in the medical profession who hold the view that "tonsil and adenoid removal in children is at the best useless and even may be harmful." I have never heard of anyone who has stated that this operation is "at best useless," and should be obliged if he would let me have the reference to the articles which "have appeared in various medical journals" which make this opinion "obvious" to him. "Significant" I agree. There are those who hold that this operation "even may be harmful," but I doubt whether those who hold this view are in a "minority," and I am confident, if they are, that it is not "small." Just the opposite. The significance lies in the growing body of men and women who believe that it is time strictly to limit this operation to "criteria" that will produce the excellent results that with him I find it gives, though that these are "well known" I doubt, or the operative activities of the many would be limited to the few in which it occurs.

I am one of those who taught Mr. Carew-Shaw's generation the aphorism about "the tonsils, all the tonsils, and nothing but the tonsils," but I now believe that the physiological movements of the palate and fauces are less impaired when a little bit is left behind at the lower pole. I am not prepared to go back upon my teaching, because I cannot say in which patient it will continue to do harm and necessitate a second operation more difficult and more damaging than the first. I prefer to limit the damage that I do by a careful selection of cases in the first instance; and for this nothing is of greater value than the long waiting list. Though the operation is never an urgent one it is probable that if after waiting for six months no harm has come to the child the advice given in the first instance was wrong. There is no need for laryngologists to "struggle with nearly overwhelming lists of children for tonsillectomy." They should use their lists and review monthly all those patients that have been on them for six months. They will thus save themselves much unnecessary work, the parents much anxiety, and the children much pain and harm. I do not believe that any surgeon can guarantee that he will do no harm by any tonsillectomy that he performs, however perfectly and by whatever method. The movements of the fauces and palate are so delicate and so numerous that any fibrosis will interfere with them, and whenever scarring is observable the damage is definite. The effect of this upon the physiology of the upper respiratory tract is far-reaching, though difficult to determine and not previously sufficiently recognized.

Mr. Carew-Shaw makes a grave accusation against himself when he suggests that he gives more care and attention to his patient when he is paid by a specific fee than when he is paid by a salary, sessional payment, or capitation grant. This is a matter that those who deal with the N.H.I. have been struggling with since its existence. It is to be regretted that some doctors do, and thereby bring disrepute upon those who are striving to give the same service to all. I do not believe that any mother should ever be expected or allowed to hand over her child for this operation with its attendant dangers after less than a quarter of an hour's discussion with the surgeon. I further believe that if he gives that amount of time to each case he will so cut down the number in which he advises operation that he will have more time rather than less upon his hands. It is a remarkable thing that when an operation has been advised the administration will always find the time, accommodation, and personnel for its performance, but that no such administration has as yet been set up which will give that minimum of a quarter of an hour between the parent upon whom the responsibility for decision rests and the surgeon in whose hands the responsibility for advising the operation is finally put.—I am, etc.,

Guy's Hospital, S.E.1. T. B. LAYTON.

Infant Mortality in Scotland

SIR,—In contrast to the Orr Committee, which has studied the problem of Scottish infant mortality from its academic, professional, and administrative eminence, may I, having studied and experienced it from below, venture on this constructive criticism of the committee's report.

The Orr report shows that the high infant mortality in Scotland is due to the low standard of living of a large part of the population, yet its main recommendations do not counteract the adverse factor of poverty itself. The experience of poverty is not confined to bad housing and poor diet, although these are important evils. There are other contributory deprivations, such as inadequacy of clothing, footwear, bedding, furniture, and cooking utensils, all of which combine to induce frustration and mental apathy.

1. *Rehousing.*—We have had rehousing schemes for almost twenty years; although they have dealt only with a small part of the population in slums, it may be assumed that the experience of these is representative of that of rehousing on a national scale. Rehousing abolishes overcrowding and reduces infection, but these benefits are lessened (*a*) when economic necessity restricts a family in the use of its house either by fuel consumption or by the subletting of rooms; (*b*) when a family has to use a common towel. In a review of the effects of rehousing over a five-years period in Stockton-on-Tees (M'Gonigle and Kirby, 1936) it was found that in the rehoused population the infant death rates were not significantly less than those in the slum areas, because the rehoused families had continued to live under the handicap of poverty. The Orr report states that in Glasgow good results have been obtained by rehousing. It is obvious, however, that so long

as the environment of poverty persists the *best* results cannot be achieved. Can a city with the highest infant death rate of the English-speaking world be content with less than the best?

2. *Diet.*—In Part III of the report (the Feeding of Mothers and Infants) it is stated that the inadequate diets of pregnant and nursing mothers among the poor are associated or correlated with the toxaemias of pregnancy, with premature birth, stillbirth, and unsuccessful lactation; yet the recommendations of the report are most vague with regard to diet. One would have expected the committee to endorse its belief in such a grave and sweeping statement by a more vigorous recommendation, such as the immediate provision of adequate meals for necessitous expectant and nursing mothers (so far as food resources permit). Sir John Orr, in his book *Food, Health, and Income,* has shown that, dividing the population into groups according to income, the higher the group the better the diet it instinctively purchases; surely this is an argument in favour of raising the economic level of the poor.

3. *Child Welfare Services.*—The report recommends their extension and improvement, and the further improvement and training of health visitors and medical staff. The health visitor of to-day is a capable (but dispirited) woman who is a State-registered nurse; many are, in addition, certified midwives, and others may have undergone special training in health visiting. At the present crude stage of the problem the qualifications of the health visitor are largely wasted, as her work consists chiefly of imparting the most elementary principles of hygiene and infant care. In this she fails—as indeed does the whole medical personnel of the child welfare service—not because of ignorance of the niceties of nutrition but because her knowledge is a useless weapon against the armour-plating of poverty.

The report also states that "clinic premises are often poor, ill equipped, and overcrowded." This is very true, but so long as poverty persists, any expenditure on the construction and equipment of specially designed clinics is wasted money. I have personal experience of conducting a clinic under the most advantageous conditions in a building designed for that express purpose. It was of no more value than the most faulty premises in a slum because of the poverty of the rehoused population for which it catered.

The Secretary of State for Scotland recently announced in Parliament that the infant mortality for 1943 had fallen to 65 per 1,000 live births, the lowest yet recorded for Scotland. He attributed this to a reduction in unemployment figures from 11.5% in 1939 to 1% in January, 1944, and to the resulting increased purchasing power. Thus we see that prosperity has struck a big blow at Scottish infant mortality. It is the common experience of child welfare workers that prosperity can transform an apathetic parent into an alert and responsive one. Encouraging as these figures are, there must still be many families which have not participated in this economic well-being.

From the Orr report we learn: (*a*) that the high birth rate of the Scottish poor is at a level desirable for the population as a whole; (*b*) that a high birth rate is not necessarily correlated with a high infant death rate, as in Scotland; (*c*) that Holland and New Zealand with high birth rates (and a higher standard of living) avoid this wastage of infant life. Is there not therefore a clear indication for recommending the speedy provision of adequate family allowances (first sponsored by the Beveridge report), which would give prosperity to that part of the population most sorely in need of it?

In conclusion, the Orr Committee has discovered the main truths concerning the high infant death rate in Scotland, but its recommendations have not kept pace with its findings.—I am, etc.,

Dyce, Aberdeen. MARGARET S. M. MCGREGOR.

Extrinsic Renal Factor

SIR,—With reference to an article in the *Journal* of Sept. 18, 1943 (p. 356), on pituitary hypothyroidism with impaired renal function, by Drs. Beaumont and Robertson, the association of these two factors is noted as "not previously referred to in the literature." While this statement is true so far as these observers are concerned, it may eventually be of some historical interest to point out that the actual discovery of the "extrinsic renal factor" was made by a group of research workers at Auckland, N.Z. The preliminary articles appeared in the *New Zealand Medical Journal* in April and June of 1941. Subsequent articles (5M and 5T) were rejected by both the *New Zealand Medical Journal* (June 6, 1941) and the *British Medical Journal* (March 23, 1942) on the grounds of lack of space and the paper shortage. The Medical Research Council of Great Britain acknowledged their receipt on June 7, 1942.

In these and subsequent articles (5A, 5P, 5H, and 5R), which are all included in our book entitled *The Electrical Factor in Metabolism,* by Abbott and Fowler, the association of this peculiar type of renal insufficiency of function with an endocrine dyscrasia is demonstrated by means of the Fowweather urea clearance technique. A description, with many illustrative cases, is also given of the new method of augmenting renal function by means of water that has been physically altered as the result of its exposure to the radiation and the electrostatic field supplied by the "scalebuoy effect."

We have suggested that a similar physical alteration in the water molecule is brought about by the metabolism of the life process with its endocrine control. The articles also deal with this new radio-electric technique in relation to a variety of clinical phenomena, such as the sedimentation rate of blood, pigmentary structures, the urea mechanism and excretion, the immunity mechanism, nephrosis, menstrual dysfunctions of the endocrinopathic type, and the hydrophilization of colloid structures in relation to a variety of phenomena such as asthma, glaucoma, fibrositis and nodule formation, diabetes mellitus, prostatic hypertrophy, acne vulgaris, and symptomatic effects of the *a*-bacterial rheumatic type.

Only a limited number of the above-mentioned book are being printed for circulation among similar research groups in Australia, Canada, Great Britain, and the U.S.A. with the object of co-ordinating the work. It is also felt that much further confirmation of the various concepts, such as that provided by Beaumont and Robertson in the case of the extrinsic renal factor, is necessary before the work could be added to the general literature on metabolism. The authors would, however, be prepared to supply a copy of the book gratis to similar interested research groups.—I am, etc.,

Epsom, Auckland, New Zealand. W. N. ABBOTT.

Sulphaguanidine and Renal Damage

SIR,—I have read with great interest Dr. H. G. Smith's article on sulphaguanidine for Flexner dysentery (Feb. 26, p. 287). He states that the high incidence of toxic rashes suggests the need for care in dosage, but my experience is that it is more important to guard against kidney damage, even when using sulphaguanidine in moderate dosage.

In the hospital in which I am working 25 adult cases of bacillary dysentery were treated with sulphaguanidine during the past year. Each patient received 51 g. in the following dosage: 9 g. daily for 3 days, then 6 g. daily for 4 days. The fluid intake was at least 5 pints per day. Urinary examination during the course showed crystals and red blood cells in 14 patients, and crystals alone in 4 patients. A morbilliform rash developed on the tenth day in 3 cases where crystals and red blood cells had appeared in the urine 4 to 6 days prior to the rash. This suggests that daily urinary examination is advisable when giving sulphaguanidine. These crystals are colourless, rectangular, and variable in size. They are easily recognized by their uniform shape, and, in addition, give the sulphonamide colour reaction.

I would be interested to hear whether Dr. Smith's cases showed any evidence of renal damage before the appearance of the toxic rash.—I am, etc.,

Whittingham, Preston. J. H. S. WHYTE.

Nutritional Neuropathies in Spain

SIR,—In the latter part of the article appearing in your issue of Feb. 26 the statement is made: "The appearance of classical pellagra in Madrid, where the population never ate maize, put nicotinic-acid deficiency on a firm aetiological footing: quick response to treatment with nicotinic acid clinches the matter." This appears to be very ambiguous. If it be intended

to suggest that this is the first time a population has developed pellagra when partaking of a non-maize diet it is incorrect. That this could occur was proved thirty years ago.

It is also not very clear what treatment with nicotinic acid "clinches." The results of treatment with this substance have been known for years. The impression is also given that Peraita's observations are all new, but the conditions he has described, though new to Spanish observers, were described many years ago.—I am, etc.,

London, W.1. HUGH S. STANNUS.

Chloroform Anaesthesia

SIR,—Dr. H. Parry Price (Feb. 19, p. 263) advocates a "crusade" against the use of chloroform. Such a crusade has been going on to my knowledge for 25 years and probably longer. As a student I was taught *not* to use chloroform, instead of *how* to use it. I learned to view chloroform in its correct perspective from an old G.P. who always uses chloroform and nothing but chloroform, and does not, in fact, know how to use anything else but chloroform. He pours chloroform on the mask as most doctors do ether, saying to the patient, "Take good deep breaths, and the deeper you breathe the sooner you will be asleep"; and in over 40 years of general practice he has never had a catastrophe.

The chloroform-phobia that afflicts our profession is astonishing. Of course chloroform is a dangerous drug; and what are we trained for if not to learn how to use dangerous drugs? If the toxicity of chloroform is assessed in relation to its greater power as an anaesthetic I doubt if it is any more lethal than ether. One must not, of course, give chloroform to a toxic, cardiac, or hepatic patient; nor must one give ether to a bronchitic patient. Certainly chloroform can cause liver damage; so can ether cause pneumonia. Chloroform has caused deaths from heart failure on the operating table; and I have seen an apparently normal, healthy woman of 34 die at the end of an operation for removal of fibroids, having had nothing but pure open ether, for no reason that anyone could discover. Of all the foul and revolting anaesthetics commend me to ether (I have myself been put to sleep by pure ether on one occasion and pure chloroform on another); the spectacle of a house-surgeon and three nurses struggling with a coughing, spluttering, vomiting, fighting patient in the attempt to anaesthetize him with ether is not one of which our profession can be proud. Moreover, with a patient accustomed to alcoholic drink ether may be useless. I have in mind one whom I would defy any anaesthetist, however skilled, to put to sleep with open ether, let alone reduce him to surgical anaesthesia.

I read that "the expert has abandoned chloroform altogether." Passing over the implication that no G.P. is "expert" and assuming that your correspondent means the consultant anaesthetist in hospital, I am aware that the latter now has a predilection for an apparatus that looks like a cross between an oil refinery and a B.B.C. transmitter, in which the cyclopropane, like the music, "goes round and around and comes out here," which is a lovely toy for those with a taste for gadgets; but the G.P. can hardly carry a hundredweight and a half of machinery in his waistcoat pocket, and consequently the G.P. uses chloroform, and will continue to use chloroform until something equally powerful, convenient, pleasant, and, withal, less toxic is discovered.—I am, etc.,

Saltash. W. H. SPOOR.

Fainting in Blood Donors

SIR,—The authors of this report to the Medical Research Council (Feb. 26, p. 279) are unable to draw any conclusions from an analysis of the data given, except to state that 45% of the donors who fainted gave a history of having done so on some previous occasion. They grouped them in ages, sexes, civil status, menstrual, married and single, following classical aetiological procedure. But this failed to reveal the secret of the fainting donor. If one examines the symptoms described and were asked to make a diagnosis one would report as follows. Excluding convulsions these are cases of autonomic nervous system disturbance. It appears possible that the fainting donor is an example of a psychosomatic reaction of the anxiety type. The aetiological factor would be a group or system of ideas connected with blood or injury, or a past traumatic experience long forgotten which, when combined with the bleeding technique, would produce an anxiety reaction. I am bleeding donors who are also my patients, and from my small personal experience fainting and collapse occur in persons who have experienced psychosomatic disorder during difficult life situations before.—I am, etc.,

Grange-over-Sands. DUDLEY MULKERN.

SIR,—The writers of the report to the Medical Research Council appear puzzled as to the factors behind this condition. Forty-five per cent. of the donors give a history of having fainted on a previous occasion—e.g., when giving blood or at the dentist. It is well known that many people are afraid of having operations performed on them. I suggest that the majority of the patients, probably all, were frightened. As a result the symptoms and signs ranging from feelings of warmth, pallor, or dizziness to vomiting, loss of consciousness, etc., were produced via the endocrine-autonomic system.

Observation of the patients for the other usual objective evidences of fear, together with an adequate feeling relationship between the patients and those in charge of the bleeding, would have made this point clear. There has been some discussion in your columns recently about the part played by psychological medicine in the future curriculum. A knowledge of the bodily changes produced by emotions should certainly be more widely spread.—I am, etc.,

S. D. MITCHELL,
E.M.S. Psychiatrist.

Preventing Necrosis of the Skull

SIR,—I am interested in the correspondence on the operation of drilling holes in the external table to let the granulations grow through. I did this operation in the spring of 1901, when I was house-surgeon at the old Royal Infirmary at Newcastle-upon-Tyne. I did it on the instruction of my chief, the late Prof. J. Rutherford Morison. I always thought it was an original idea of his, and he should have the credit for it. I hope this will fill the gap in Prof. Grey Turner's memory. He was surgical registrar at the time, and at a later date trephined the same patient.—I am, etc.,

Sunderland. R. H. DIX.

Just Suggestion?

SIR,—Dr. J. Frankland West in his letter (Feb. 19, p. 267) seems to have come to the inevitable conclusion about what he calls his "fibrositis"—that many things will relieve the symptoms, but that current medical practice can do nothing to remove them once and for all. I would suggest that just so long as the medical profession fails to take into account the work of F. Matthias Alexander, just so long will they be defeated by these and similar problems. Alexander has shown by his work that our general functioning is profoundly influenced by the way in which we use ourselves in all our daily activities, and that by constantly misusing ourselves in the simple activities of living we are bringing a constant influence for ill to bear upon our general functioning. Until we realize this fact our diagnosis is bound to be incomplete, and we demonstrate our lamentable ignorance when we content ourselves with uttering the latest catchword of medical terminology. Dr. F. G. Crookshank has written: "Diagnosis which, as Mr. Bernard Shaw has somewhere declared, should mean the finding out of all there is wrong with a particular patient and why, too often means in practice the formal and unctuous pronunciation of a Name which is deemed appropriate and absolves from the necessity of further investigation."

Dr. F. M. R. Walshe, in his stimulating article (Feb. 5), has given Crookshank's work the recognition it deserves. It is inevitable that Alexander also will eventually get recognition from those concerned with medical education. Meanwhile Dr. West will perhaps find that a study of Alexander's work will give him a more hopeful approach to his problem.—I am, etc.,

London, S.W.1. WILFRED BARLOW.

Obituary

J. W. H. EYRE, M.D., M.S., F.R.S.ED.

With the passing of Prof. John William Henry Eyre bacteriology in this country has lost one of its outstanding personalities. He was born in 1869 and, after being educated at first privately and then at the Whitgift Grammar School, entered Guy's Hospital Medical School as a student at the age of 20. He quickly qualified M.R.C.S., L.R.C.P., and graduated M.B., B.S. of Durham University. Within a few years he had also obtained both the M.D. and M.S. degrees, and had meanwhile received his first appointment to Guy's Hospital (1894)—namely, that of ophthalmic assistant and registrar. For a time he devoted himself mainly to these duties. But the remarkable aptitude which he showed later for laboratory investigation almost at once declared itself, and his work, carried out under Washbourn's influence, on the normal bacteriology of the eye and a series of papers on tuberculosis of the conjunctiva stand as classics to this day. At this time the potentialities of medical bacteriology were becoming obvious to everyone, and, increasingly attracted to the new work, Eyre in 1899 took up the post of bacteriologist and lecturer at Charing Cross Hospital. Coincidently the Council of the B.M.A. awarded him the first Ernest Hart Memorial Research Scholarship, and then, within three years, he returned to his old hospital, succeeding Dr. Washbourn as bacteriologist to Guy's.

The present generation will scarcely credit the smallness of the space considered in those days adequate for the bacteriology of a large hospital. Eyre had first to work in minute quarters near the old bakery. But, quite unaffected by this handicap, he at once began vigorously to help in the advancement of his subject. In 1905 we find him co-opted by the Royal Society to the Advisory Board of the Commission on Mediterranean Fever, acting as chairman of the working party in Malta and making valuable contributions to the final report. Over the same period he did much work in improving the prevailing laboratory methods, culminating in his famous book, *The Elements of Bacteriological Technique*. His papers on pneumonia and pneumococci and the causes of institutional dysentery were also noteworthy. Such activity was bound to call for enlargement of his laboratories, and in 1910 a large new bacteriological department was developed at Guy's entirely to Eyre's own design. Accommodated in buildings adjoining the older surgical wards, these new premises formed for many years one of the show departments of the hospital, remaining a model of their kind and successfully meeting every new demand upon them right up to the time of his retirement in 1934. The systems which Eyre devised for handling records and accounts, as well as the actual technical work, have formed the basis of much subsequent routine laboratory development, and it is remarkable that an organization so firmly standing the test of time should have been designed when the science itself was still so very young; proof, indeed, of Eyre's exceptional foresight with regard to his specialty. Appreciation of his work was shown by appointments as Erasmus Wilson Lecturer and a Hunterian Professor at the Royal College of Surgeons and Milroy Lecturer before the Royal College of Physicians. In 1920 the title of professor of bacteriology in the University of London was conferred upon him, Eyre having already held a readership in the subject for many years. Just previously, throughout the last war, he had acted as bacteriologist to R.A.F. and other wartime hospitals, and was a member of both the Trench Fever Committee of the War Office and the Chemical Warfare Committee of the Medical Research Council. As an examiner he was excellent; always fair, always courteous. For the University of London he acted in State medicine from 1911 to 1915 and in bacteriology between 1923 and 1928. For the Royal College of Surgeons he examined in public health from 1917 onwards and in tropical bacteriology from 1911 to 1920. A most efficient chairman, whether of scientific meetings or administrative committees, his activities in this direction seemed endless. Notably he was president of the Royal Microscopical Society (1920–1), of the Hunterian Society (1939–42), and of the Royal Institute of Public Health and Hygiene (1942). He had also served as president of the Section of Bacteriology and Pathology at the Annual Meeting of the British Medical Association in 1913.

Eyre's interests and reputation extended far beyond his own country, and he was an active corresponding member of both the Société de Pathologie Exotique and the Société de Pathologie Comparée. His editorship of the revised English translation of *Experimental Bacteriology*, by Kolle and Hetsch, was masterly. Not all his work was, however, experimental; much of it had very direct clinical bearing, and his power to apply his laboratory research to the needs of everyday medicine is well illustrated by his collaboration with Dr. Bosanquet (1909) in a small but very practical book *Serums, Vaccines, and Toxins in Treatment and Diagnosis*. Even then one has not catalogued all his activities. For a great many years he held the appointment of bacteriologist to the Worshipful Company of Fishmongers, which accounts for a series of reports upon the bacteriology of the various edible molluscs, the most notable being, perhaps, on the oyster in relation to public health in 1924. His methods of systematic prevention of pollution of the nation's supplies must have prevented many, many epidemics. In addition to all this he was throughout his long life a very prominent Freemason, reaching high office and living according to the very highest traditions of the craft. As seen from the dates already given advancing years did little to reduce Eyre's activity, and his career is remarkable in extending continuously from the very earliest days of clinical bacteriology right down to the present time. It must have been a great satisfaction to him to see how many of his own earliest technical innovations would obviously long survive him. There is no doubt that practical bacteriology as we know it to-day owes much to Eyre's inventive genius.

A man serving so long as 32 years on the staff of one teaching hospital must inevitably have appeared in somewhat different lights to succeeding generations of Guy's men, but from beginning to end everyone knew, loved, and honoured "Johnny" Eyre. Whether one met him as colleague, student, or patient, there was something so dynamic in his personality that its origin in one of such minute stature always remained somewhat of a mystery. His energy was extraordinary and devoted unsparingly to every task or problem he met. Success never spoiled him; he was entirely without conceit. One so small was fated to be the student caricaturist's joy, and the *Gazette* of his hospital carries many humorous but always kindly reminders of at least one characteristic which he shared with the minute beings he delighted to study. No one ever asked his help in vain, and it is doubtful whether one has ever heard more expressions of true appreciation and affection than came from his many friends who attended the farewell dinner given to him when he retired from Guy's. Those who actually worked with him would go further. There are many to-day engaged in the laboratory aspects of medicine who owe much not only to Eyre's inspiration but to his unfailing interest in the welfare of everyone, from the highest to the lowest, who ever worked in his department. For his immediate colleagues a great man's memory will indeed outlive his life. F. A. K.

Dr. T. BLANCHARD SELLORS writes: Prof. Eyre's friendship was a privilege I enjoyed for forty years, since, in fact, the time he was making up his mind to give up eyes for "bugs." In those days few, if any, hospitals had a special chair in bacteriology, and for a few years he acted as assistant to Dr. Washbourn, then in charge of public health at Guy's. He was given the new appointment of bacteriologist at Charing Cross, returning to Guy's when a similar post was created there. He was a tireless worker, and practically died, as he had lived, in harness: no amount of persuasion could induce him to retire. His spare time was chiefly devoted to Freemasonry, wherein he was a Past Deacon of Grand Lodge and Past Master of the Grenadiers and Aesculapius Lodges. We worked together for three years in preparing the history of the first-named for its bicentenary in 1939, and though the festival had to be abandoned on account of the war, the volume remains for me as testimony to a frequent and very friendly collaboration. Others can write with better knowledge of his professional attainments, but only those who knew him could tell of the happiness of his family life, the worth of his friendship, and the value of his varied experience. Few of his colleagues, by the way, are aware that he was a successful journalist before adopting medicine as his life's work.

WILLIAM ROBINSON, M.D., D.P.M.

Dr. William Robinson died at Tankerton on Feb. 21. He was the younger son of William Henry Robinson, was born at Skipton, Yorkshire, on Oct. 19, 1888, and was educated at Skipton Grammar School, proceeding to the Medical School at Leeds University. There he had a very distinguished career

as a student, obtaining many prizes and honours, including the gold medal for anatomy in his year. He graduated in medicine with honours in 1911.

Immediately after qualification he undertook the "summer locum" at the West Riding Asylum, Wakefield, and this temporary appointment was destined to influence his whole life, as previously his intention had been to follow a surgical career. After a few weeks in private practice he returned to Wakefield as assistant medical officer on the permanent staff. Hard work and scrupulous care earned him rapid promotion. In 1913 he obtained the D.P.M. of Leeds, becoming one of the earliest holders of this diploma from that teaching school, and he followed Henry Devine as deputy to Prof. J. Shaw Bolton, at that time medical director. When war broke out in 1914 he immediately offered his services, was fortunately appointed a Command Psychiatrist, and at once went over-seas. He served in this capacity in France until the end of hostilities. He returned to his duties at Wakefield Mental Hospital in 1919, and in 1920 obtained the M.D. degree of Leeds University. He later published his thesis, *The Future of Service Patients in Mental Hospitals*; this was regarded for some years as a classic and quoted on many occasions. In the same year he was appointed at the early age of thirty-two medical superintendent at Brentwood Mental Hospital. After five years' strenuous work there he was appointed medical superintendent at the City of London Mental Hospital, Dartford, a position he resigned on medical advice on Nov. 1, 1943.

His work as medical superintendent at Brentwood and Dartford was indefatigable, and both institutions owe much to him. His first consideration was for the welfare and comfort of the patients under his care; they came first, and next he valued a contented and happy staff, his efforts always being for those with whom and among whom he worked, starting with the most lowly. While at Dartford he had many outside interests; besides being consultant psychiatrist to several of the surrounding general hospitals he was an active member of the local hospital committee and medical adviser to two other general hospitals. A considerable amount of Robinson's best work will never be known; much time and labour, much advice, he gave "behind the scenes." To those who knew him some of the terms used in the 1930 Act were already familiar.

William Robinson joined the B.M.A. in 1926. He was secretary of the Dartford Division from 1937 to 1939; chairman of the Division from 1929 to 1931, and from 1935 to 1936; and president of the Kent Branch from 1932 to 1933. He was secretary of the Local Medical War Committee from its inception until October, 1943. His duties in this latter position were not always easy, but his tact in handling difficult matters was appreciated both locally and centrally. By his early passing there has been lost to medicine a physician, a psychiatrist, an administrator, all of outstanding merit.

Dr. JAMES PRIOR, formerly a well-known and much-respected practitioner in Heckmondwike, died at the end of last year at Adel, Leeds. He was a native of Dewsbury and studied medicine at the Leeds Medical School and St. Thomas's Hospital, London, qualifying as M.R.C.S., L.R.C.P. in 1894. Returning to Dewsbury he served for 4½ years as resident house-surgeon at the Infirmary, and in 1900 began private practice at Heckmondwike. He spent 23 years as medical officer and public vaccinator for the district, and was for a long period medical officer to the Staincliffe Infirmary and surgeon to the Dewsbury Infirmary. Dr. Prior joined the B.M.A. in 1903 and held office as chairman of the local Division in 1926–7; he retired from practice in 1933. He did good work for the St. John Ambulance Brigade and had many interests outside his profession.

The death of Dr. R. MUZIO WILLIAMS on Dec. 14 came as a great shock to his many friends, for, in spite of his 84 years, he always appeared to be full of youth and energy, and indeed had been in London at a luncheon of the United Hospitals Club only a few days before. Born in 1860, he was the fourth son of Henry Owen Williams, D.L., J.P., who was High Sheriff of Tre-Arddur and Tre-Castell, Anglesey. At St. Thomas's Hospital he gained the first entrance science scholarship in 1879. He qualified M.R.C.S. and L.S.A. in 1884, L.R.C.P. in 1885, M.B.Lond. in 1887, and M.D. in 1888. In 1885 he was appointed resident house-physician at St. Thomas's, and from 1886 to 1887 he held the post of resident at the London Fever Hospital. The next year found him as a ship surgeon in the s.s. *Magellan*, in which he served for eight months; and in 1889 he became medical officer to the Florence Nightingale Hospital for Gentlewomen. In 1881 he married and settled down in general practice in the area round Hyde Park, where he continued until his retirement. "Muzio"—as he was known to his friends—was the ideal type of general practitioner, equally at home with and acceptable to peer or pauper, man, woman, or child; and was as dearly loved by his patients as by his friends, many of whom will remember him for his humour, his unfailing kindness, and the thoroughness he displayed in everything he undertook. With each of his patients every small detail was gone into, and the most minute instructions were given, in fact usually written—an example which younger generations of medical men would do well to follow. In 1921 he took a partner with a view to retiring from practice, which he did in 1923. No man ever showed more loyalty to his partner or worked harder to further his successor's interests. He retired to live at Midhurst, and in retirement his unbounded energy, always devoted to his fellow men, found him on the Board of the Royal West Sussex Hospital, of which he became chairman 1929–30; and it was during this term of office that he had the honour of receiving the Princess Royal when she opened the David Ewart Memorial Nursing Home. In the same year he was made a J.P. for Sussex. He was a most enthusiastic St. Thomas's man, following all the hospital's activities so far as he could, frequently arriving there with patients—often in the middle of the night—and, when his work permitted, turning out to see the hospital play in the inter-hospital rugby matches. There were few gatherings connected with the hospital at which he was not to be seen. He was a keen member of St. Thomas's and Guy's United Hospital Club, and a regular attendant at all its dinners and lunches; in 1930 he took the chair at the St. Thomas's Old Students' annual dinner. At the end of the last war, when a fund was started as a memorial to old St. Thomas's men who had died for their country, he was instrumental in collecting a large part of the money, and served on the committee entrusted with its administration. His life was a great example in carrying out the ideals of the medical profession.

W. H. C. R.
E. N. S.-R.

Dr. LAURENCE JAMES BLANDFORD of Worcester died after a short illness on Feb. 29. He was born at Coxhoe, Durham, in 1876 son of Col. J. W. Blandford, and received his education at Repton School and Durham University. He graduated M.B., B.S. in 1899, and after a house-surgeoncy at the Royal Victoria Infirmary, Newcastle, proceeded to the M.D. in 1902, and some years later took the D.P.H. of the Dublin Royal Colleges, with honours. Dr. Blandford attained the rank of colonel A.M.S.(T.) in the last war, and was awarded the C.B.E. and Territorial Decoration in 1919 for his services with the 50th Division. After the war he became Deputy Commissioner for Medical Services under the Ministry of Pensions, and later Principal Medical Officer for the Midlands Region. He had been M.O.H. for Stockton-on-Tees Rural District and honorary surgeon to the Stockton and Thornaby Hospital. He joined the B.M.A. in 1900 and represented his Division at three Annual Meetings. He served at headquarters on the Naval and Military Committee, on the Territorial Force Committee, and on the committee concerned with expansion of Army Medical Services in case of national emergency.

Dr. PERCY JAMES KELLY died at Maidstone on Feb. 12 after a short illness, aged 68. He studied medicine at the University of Glasgow, and after qualifying M.B., Ch.B., joined the Colonial Medical Service in 1908. He served in Nigeria, Hong Kong, and Ceylon, where he was Registrar of the Medical College, and in British Guiana, where he was Surgeon-General from 1922 to 1932, in which year he retired and was awarded the C.B.E. During the last war Dr. Kelly was a captain in the R.A.M.C. at Salonika and in France; in 1936 he led the second Red Cross expedition to Abyssinia, which reached Gondar before it was compelled to retire by the victorious Italians. During the present war he served in several ships of the Merchant Navy which took part in the North African and other operations; he was about to sail again when his life was cut short. Dr. Kelly was president of the British Guiana Branch of the B.M.A. in 1927–8. He leaves a widow, two sons who are now serving with our Forces on the Burma Front, and two daughters. The elder son is Major L. M. Kelly, I.M.S.

The medical profession, general practitioners in particular (writer H. C. P.), are the poorer by the sudden and tragic passing of ARNOLD GEORGE TOLPUTT on Feb. 18. Of that truth ample evidence was provided by the gathering of every class of the community assembled at Kettering Parish Church on Feb. 21 to pay their last tribute of respect and affection to his memory. Every body, every organization, ambulance, fire brigade, wardens and A.R.P. personnel, police, town council, hospital staff, nursing and medical, those with whom he had spent so much of his time with untiring devotion, skill, and energy, in addition to a host of his patients and friends, were all there in token of their gratitude to Arnold Tolputt for his unfailing kindness and generous character. He came to Kettering well over 40 years ago as locumtenent with Dr. Paul Roughton, who was not slow to realize that he had discovered a man of outstanding ability and character. A firm and lasting friendship

and successful partnership were soon established. As, I am proud to think, one of his oldest friends, I am as well qualified to express, though imperfectly, the appreciation of a colleague who was a man in the truest sense, a loyal friend, one who was honest and straightforward in his dealings with all men, and a practitioner of marked ability and wide experience. I look back with pleasure on very many happy hours during the last 43 years spent in co-operation and friendly rivalry with him in our professional and social activities. To say that we shall miss him does not express all that we feel. It can be truly said of him, "Well done, thou good and faithful servant."

Dr. LYDIA ANN LENEY died in London on Feb. 15. The daughter of Edmund Leney, she was born at Lewes, and from Cheltenham Ladies' College entered the London School of Medicine for Women. In 1895 she took the Scottish Triple diplomas and in the following year obtained the L.M. of the Rotunda Hospital and the M.D. of Brussels University. Her main professional interests were ophthalmology and instruction of mothers in the care of children. Dr. Leney was for some time assistant R.M.O. at the Medical Mission Hospital, Plaistow, and then M.O. in charge of the Mary Ward School for Mothers. With this work she combined that of oculist under the old London School Board; later she became chief assistant at the Royal London Ophthalmic Hospital, refractionist to the L.C.C. Clinic, Battersea, and examiner and lecturer in first aid, home nursing, and infant care under the L.C.C. She joined the B.M.A. in 1898 and was a member of the Oxford Ophthalmological Congress and the West London Medico-Chirurgical Society.

Dr. ROBERT NIMMO WATSON died suddenly at his home in Harrogate on Feb. 15, aged 67. He was born at Invercargill, New Zealand, and studied medicine in London at the Westminster Hospital, where after qualifying M.R.C.S., L.R.C.P. in 1900 he held house appointments. He joined his cousin, the late Dr. Crawford Watson, at Harrogate in 1902 and became honorary physician to the Royal Bath Hospital and Rawson Convalescent Home; he also served for 40 years as medical officer to the Northern Police Convalescent Home and Orphanage. Dr. Watson joined the B.M.A. in 1903 and was a member of the International Society of Medical Hydrology. He had been president of the Leeds and West Riding Medico-Chirurgical Society and of the Harrogate Medical Society. During the last war he served over-seas with the rank of temporary captain, R.A.M.C.

We regret to announce the death on Feb. 21 of Dr. HERBERT HALL, who had a large practice at Hartlepool, and was senior honorary physician to the Hartlepools Hospital. He was born near Dublin in 1898, and graduated M.B., B.Ch., B.A.O. of Dublin University in 1922, after serving in the last war as surgeon probationer R.N. He became house-surgeon at the Hartlepools Hospital in 1924, and a year later, when he joined the late Dr. Brogden in partnership, he was appointed to the honorary staff, and also held the posts of district medical officer, public vaccinator, and police surgeon. In his private practice Dr. Hall won the affection of his patients and proved himself a good and kind friend to many poor families. He had a particularly warm regard for children, and did much to help young people in Hartlepool, as the probation officers and other welfare workers can testify. Dr. Hall joined the B.M.A. in 1925, and was elected chairman of the local Division in 1936.

Mr. WILLIAM MCGREGOR YOUNG of Leeds, who died last month, was educated at the University of Glasgow, taking first an Arts course and graduating M.A. in 1885. He then became a medical student and took the degrees of M.B., C.M. in 1889 with commendation, and proceeded M.D. in 1901. Throughout the whole of his medical career he practised in Leeds. He was for many years honorary surgeon to the Leeds Maternity Hospital and surgeon to the Leeds Southern Dispensary. He joined the B.M.A. in 1897 and had been an active member of the North of England Obstetric and Gynaecological Society and of the Leeds and West Riding Medico-Chirurgical Society. In former years he often acted as anaesthetist for the late Lord Moynihan, and he wrote the article on ether for the *Encyclopaedia of Medicine*. Long before 1914 he had been a keen Volunteer, and during the last war he was in command of the 2nd West Riding Field Ambulance with the rank of lieut-col. R.A.M.C.(T.).

We regret to announce the death in retirement at Oulton Cross, Stone, Staffordshire, of Mr. REGINALD ALCOCK, C.B.E., F.R.C.S.Ed. He was born in 1868, son of John Alcock, J.P., of Portland House, Burslem, and was educated at Owens College, Manchester, where he won the Hulme Hall Scholarship. He graduated M.B., Ch.B. of the Victoria University in 1893 and took the F.R.C.S.Ed. diploma in 1910. He then returned to the Potteries and spent the rest of his life there, serving many years as surgeon to the North Staffs Royal Infirmary and consulting surgeon to the Leek Cottage Hospital and the Haywood Hospital, Burslem. During the last war he was senior surgeon to the Stoke-on-Trent War Hospital, and for that service was awarded the C.B.E. in 1919. Mr. Alcock joined the B.M.A. in 1894, had been honorary secretary of the North Staffs Division, and in 1922 president of the Staffordshire Branch; he was also a vice-president of the North Staffs Medical Society.

Dr. Muriel Barton Hall writes: May I add my regret to that of another correspondent at the passing of HERBERT NOTT. He practised for many years not at Long Sutton, but at Little Sutton, where he was loved and respected by his patients. He brought my four younger sisters into the world, and I recall from an early age his dapper figure walking into the house unannounced, his confident, reassuring manner, the twinkle in his eye, and, as I grew up and became a medical student, evidence of his skill and efficiency. He was the perfect general practitioner to rich and poor alike, and his decision to give up his country practice in order to specialize was a grievous loss to his patients, many of whom still recall his services with admiration and gratitude.

Medico-Legal

SURVIVORSHIP IN AIR RAIDS

The succession to property sometimes depends on which of two or more persons involved in a common calamity dies before the others. Before the sweeping changes which Lord Birkenhead introduced into property legislation in 1925, the law assumed that "commorientes" died simultaneously unless evidence showed otherwise. The Law of Property Act, 1925, Section 184, provided that where two or more persons have died in circumstances which render it uncertain which of them survived the others, then the deaths are presumed to have occurred in order of seniority, the younger surviving the elder. In 1942 Mr. Justice Bennett tried the first case under this section arising from an air raid. A husband and wife were found dead after a bomb had fallen on the house where they were sleeping in the same room, but the judge held that their simultaneous death had to be positively proved by evidence, and he did not find the evidence brought in favour of it strong enough to override the presumption that the younger survived the elder.

This somewhat unsatisfactory result, though it seemed to accord with the wording of the statute, has now been modified by the Court of Appeal.[1] Five members of a household were killed together in a basement shelter by the same bomb. A brother of two of the victims, claiming as a residuary legatee of one and next of kin of the other, claimed that, as no proof was given that the victims had died together, they should be deemed to have died in order of seniority, which would have had the effect of invalidating wills made by some of the victims. The Master of the Rolls, Lord Greene, said that the first question was whether as a matter of law two persons can ever die simultaneously. Counsel had argued against the plaintiff that the law does not recognize this possibility because, as time is infinitely divisible, one of two persons must always in fact die before the other, though it is usually impossible to prove which died first. He described the infinite divisibility of time as a scientific fact, but Lord Greene preferred to call it a metaphysical conception. No doubt, his lordship added, when a bevy of angels is performing saltatory exercises on the point of a needle it is always possible to find room for one more. Propositions of this character appeared to him, however, to be ill suited for adoption by the law of this country, which proceeds on principles of practical common sense. To speak of the infinite divisibility of time in relation to a modern high-explosive bomb bursting among persons in a shelter seemed to him to ignore the realities of the case. He did not regard simultaneous death in these circumstances to be so improbable as some authorities, including Mr. Justice Bennett, had thought. Nor did he think that the words of the section covered the case of simultaneous death. He thought that the words "uncertain which of them survived the others" applied only to a case in which the proper inference from the facts is that the victims died consecutively; it does not, he said, apply if the court finds on the evidence that they died simultaneously. In such a case Parliament has not laid down a presumption about the order of death. In the present case the possibility of the deaths having been consecutive was too remote to be considered. He gave the warning, however, that simultaneous death need not be inferred in every case in which two persons are killed by the same bomb. Where, for example, two

[1] *Re* Grosvenor, (1944) 1 All E.R. 81.

persons killed by blast were some distance away from one another, the court might well decline to draw the inference; and if the persons were killed by splinters the possibility that their deaths were simultaneous might be remote. Lord Justice Goddard agreed, but Lord Justice Luxmoore could not feel so certain as his brother judges that the victims had died simultaneously. He had heard of cases in which, when shelters had been hit, some of the inmates were found alive though the others had perished. The vagaries of burst and blast were notorious. He felt he would require the assistance and experience of an expert before he could conclude that two or more given persons died at precisely the same moment.

The Services

Acting Surg. Cmdr. K. Forsythe has been awarded the R.N.V.R. Officers' Decoration.

The *London Gazette* has announced the appointment as O.B.E. (Military Division) of Capt. (Temp. Major) N. B. Hall, R.A.M.C., in recognition of gallant and distinguished services in the field.

CASUALTIES IN THE MEDICAL SERVICES

Wounded.—Temp. Majors F. Elliott and A. A. C. Ross, R.A.M.C.; Lieut.-Cols. S. T. Davies and V. E. M. Lee, I.M.S.

Prisoners of war.—Temp. Majors P. M. Bloom and E. Egan, Capt. C. Hecht, War Subs. Capts. J. F. Clark, H. E. De Wardener, J. Diver, R. W. Lennon, J. C. McNeilly, and J. E. Moss, and Lieut. P. T. Chopping, R.A.M.C.; Temp. Lieut.-Col. G. B. S. Chawla, Major K. Rai, Acting Majors S. A. Hasan and K. N. Rao, and Capt. N. G. Latey, I.M.S.

Missing at sea.—Capt. J. R. O. Thompson, R.A.M.C.

Missing, believed killed.—Surg. Lieut. D. L. Sandes, R.N.V.R.

Died.—Major S. W. H. Askari, I.M.S.

DEATHS IN THE SERVICES

Air Commodore BASIL ALFRED PLAYNE, D.S.O., who retired from the Medical Branch of the R.A.F. in 1938, died on Feb. 6 after a long illness at Minchinhampton, Gloucestershire. He was born in 1885 youngest son of the late Edward Playne of Minchinhampton, and from Clifton College entered Pembroke College, Cambridge, with an exhibition, taking his B.A. in 1907. He then went on to St. Bartholomew's Hospital, and qualified M.R.C.S., L.R.C.P. in 1910. After serving as extern midwifery assistant at Bart's and senior house-surgeon at the Miller General Hospital, Greenwich, he graduated M.B., B.Ch. at Cambridge in 1912. For his services as a temporary surgeon R.N. throughout the last war he was mentioned in dispatches and awarded the D.S.O. in 1915. Joining the R.A.F. he held a number of posts and became Principal Medical Officer in turn of the Aden Command, the Iraq Command, the Halton Command, and from 1934 until his retirement in 1938 of Coastal Command Headquarters.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

At a Congregation held on Feb. 25 the following medical and surgical degrees were conferred:

M.CHIR.—B. N. Brooke (in person).
M.B., B.CHIR.—R. C. Barclay, K. Chitty, F. A. L. da Cunha (all by proxy).

UNIVERSITY OF LONDON

The following candidates have been approved at the examination indicated:

THIRD M.B., B.S.—[1]P. S. London, P. Abbey, A. C. Akehurst, Winifred N. Backhouse, G. H. Bancroft-Livingston, Winifred M. Bond, W. Brand, Elizabeth T. Brash, P. Brightwell, F. S. W. Brimblecombe, H. W. Bunje, G. E. Catton, E. H. Couper, W. E. Craddock, Catherine F. Crofts, A. J. E. Duddington, P. D. A. Durham, W. H. Dyson, A. J. Eley, M. E. Evans, J. M. Fabricius, Elizabeth de C. Falle, D. L. B. Farley, S. C. Farman, J. H. Ferries, P. G. Finch, C. O. Fung-Kee-Fung, G. W. Garland, A. P. Goffe, M. E. H. Halford, L. H. Hamlyn, R. H. Heptinstall, E. G. Herzog, A. J. H. Hewer, Norah Hewitson, Monica M. Hogben, J. E. Hotchin, C. A. Houlder, Elizabeth M. Hugill, R. W. L. Hurt, P. E. Jackson, B. V. Jones, E. C. B. S. Keat, Margaret Kemsley, A. B. Lee, C. A. Leeson, M. Leivers, E. Levy, W. D. Linsell, G. R. G. Mackarness, K. M. Mackenzie, T. P. Mann, C. G. Martin, L. G. C. Martin, Edith S. M. Merry, J. K. Morgan, W. S. Morgan, D. Munro-Ashman, Jean Myers, Diana J. Myott, A. Noskwith, A. W. Nurick, A. C. F. Oglivie, J. P. Partridge, Cicely Pepler, Marion J. Phillips, J. E. L. Price, L. Radclyffe, A. M. Rajah, D. L. Rees, T. H. Richards, D. R. S. Saunders, J. Siegler, I. R. Sinton, I. T. The, A. M. B. Tompkin, E. L. Trickey, G. Trosser, Joyce F. Tucker, E. Tuckman, K. A. D. Turk, E. C. Turton, Eileen M. Vale, R. G. White.

[1]With honours and distinction in surgery.

UNIVERSITY COLLEGE HOSPITAL

Prof. A. A. Miles, F.R.C.P., will deliver the Sydney Ringer Memorial Lecture for 1944 in the lecture theatre of University College Hospital Medical School, University Street, Gower Street, W.C., on Tuesday, March 21, at 4 p.m. His subject is "The Epidemiology of Wound Infection," and the lecture is open to qualified practitioners and medical students.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

The following lectures, open to medical practitioners and advanced students, will be delivered this month at the College in Lincoln's Inn Fields at 4 p.m. One Hunterian Lecture by Prof. L. Leigh Collis on March 14 on the aetiology of cerebral abscess as a complication of thoracic disease; two lectures by Dr. Geoffrey H. Bourne, on March 21 on the problem of bone formation, and on March 23 on vitamin C and the regeneration of bone; two lectures by Prof. Arnold Sorsby, on March 28 on blindness in childhood, past achievements and present problems, and on March 30 on the sulphonamides in ophthalmology, their use and limitations.

Correction.—Owing to a printer's error in the report of the meeting of the Royal College of Physicians of London in the *Journal* of Feb. 12 (p. 239) the following names were omitted from the list of candidates who had passed the Final Examinations of the Conjoint Board:

W. R. Horsfall, C. A. Houlder, Elizabeth M. Hugill, A. L. Humphrey.
The initials of T. M. Humphry were wrongly given as W. R. Humphry.

Medical News

Two organizations—the Health Workers' Council and the Social Security League—have jointly arranged a public conference on "Planning for Health: Medical Services and the Beveridge Report," to be held in the Conway Hall, Red Lion Square, W.C., to-morrow (Sunday, March 12) from 3 to 6.30 p.m. The speakers will include Dr. Haden Guest, M.P., and Dr. H. Joules.

A meeting of the Clinical Society of the Royal Eye Hospital will be held at the hospital on Friday, March 17, at 4.30 p.m., when a talk will be given by Mr. L. V. Cargill on "Sir William Bowman."

At a meeting of the Tuberculosis Association to be held at Manson House, 26, Portland Place, W., on Friday, March 17, at 3.15 p.m. a discussion on the problem of primary tuberculosis in children, especially in the under-5 age group, will be opened by Drs. W. Gaisford, W. Richards, A. Margaret Macpherson, and G. Jessel. Members of the British Paediatric Association have been invited to take part in this joint discussion.

Dr. Innes H. Pearse will give a public lecture on "The Peckham Experiment" on Wednesday, March 22, at 6.45 p.m. in the Alliance Hall, Palmer Street, Westminster, S.W. Applications for seats to be reserved should be sent to the Secretary, Science (Research) Society, 31, Broadhurst Gardens, Eastcote, Middlesex.

The London School of Hygiene and Tropical Medicine has arranged a week-end course for medical practitioners on Factory Medical Services and Industrial Diseases on Saturday and Sunday, March 25 and 26. The session on March 25 will be opened at 2 p.m. by Sir Wilson Jameson and will be devoted to tuberculosis and the industrial worker and to industrial diseases of coal-miners. At the morning session on March 26 medical inspection of canteens and young persons in industry will be discussed, and in the afternoon a paper on medical selection of factory personnel will be followed by a medical "brains trust." The fee of one guinea for the course (and 2s. 6d. if lunch is required on Sunday) should be sent to the Secretary of the School, Keppel Street, W.C.1, not later than March 20.

It was announced in 1941 that since large quantities of phenol were required for purposes directly connected with the war, its use for other purposes should be restricted as much as possible. We understand that the supply position has improved, and that increased quantities are now being made available for medical use.

At a meeting of the Central Midwives Board for Scotland, Prof. R. W. Johnstone, P.R.C.S.Ed., and Prof. James Hendry were elected Chairman and Deputy Chairman respectively for the ensuing year. Examiners were appointed and institutions were approved for the training of pupil midwives.

By an amendment, which became official on Feb. 18, a monograph on liquid extract of belladonna leaf has been added to the *British Pharmacopoeia*, 1932. In future when liquid extract of belladonna is prescribed or demanded, liquid extract of belladonna leaf may be dispensed or supplied.

The supply of rubber gloves to hospitals and similar institutions, and through them to doctors, nurses, and midwives for use in institutions will continue to be controlled centrally by the Priority Officer of the Ministry of Health as at present. For doctors in private practice the ration will be six pairs a year, and applications for certificates should be made to the Central Medical War Committee, B.M.A. House, Tavistock Square, W.C.1, marking the envelope "Gloves" and enclosing a stamped addressed envelope for reply. Applications for "supplementary rations" should be made to the Regional Offices of the Ministry of Health.

The December issue of the *Medical Record* of New York is a Neuburger number devoted to Prof. Max Neuburger, the eminent medical historian, in celebration of his 75th birthday.

The Marcel Benoist prize for 1943 has been awarded to Prof. Arthur Stoll of Basle for his work on pharmacological chemistry.

Dr. H. G. Massiah has been appointed a member of the Legislative Council of the Island of Barbados.

EPIDEMIOLOGICAL NOTES

Discussion of Table

In *England and Wales* during the week there were rises in the incidence of measles by 375, scarlet fever by 193, acute pneumonia by 65, and of dysentery by 57 cases; the notifications of whooping-cough fell by 184. The deaths from influenza in the great towns have steadily dropped since the week ending Dec. 11, when 1,148 were recorded; there were only 38 deaths during the week under review; but the returns for the week ending Feb. 26 show an increase of 8 deaths.

There was an increase in the incidence of scarlet fever in most areas, the largest being in Warwickshire, with 34 more cases. Notifications of whooping-cough were down by 51, 49, and 38 in Yorks West Riding, Lancashire, and Sussex respectively, and up by 25 in London and 24 in Middlesex. During the past six weeks the incidence of measles has been trebled: the largest increases during the week were in Kent by 91, in Norfolk by 89, and in Lancashire by 87.

Dysentery, with 277 notifications, was again on the increase, the returns being the highest for any week during recent years except for two occasions in 1943. The only fresh outbreak of any size during the week was in Shropshire, Ludlow R.D. 26. The cases rose from 31 to 61 in London and involved seventeen boroughs (Hackney 23, Islington 11). The largest of the other centres of infection were Surrey 24, Glamorganshire 21 (Cardiff C.B. 20), Lancashire 16, Middlesex 13, Warwickshire 10.

In *Scotland* cerebrospinal fever and dysentery rose in incidence by 16 and 63 cases respectively, the notifications of these diseases being the highest during recent months. Half the 33 cases of cerebrospinal fever were reported from the city of Glasgow. The principal outbreaks of dysentery were Ayr county 61, Glasgow 20, Aberdeen county 10. There was a slight rise in the notifications of scarlet fever by 15 cases, and there were 35 fewer cases of whooping-cough, 26 of acute primary pneumonia, and 10 of measles.

In *Eire* there was a further small rise, 10, in the notifications of diphtheria. Of the 324 cases of measles 295 were notified in Dublin C.B.

Smallpox: A Warning

Smallpox has appeared in the county of Middlesex, at Mount Vernon Hospital, where 3 out of 8 patients with the disease have died. A number of people have visited the hospital, and as many as possible have been traced and offered vaccination or re-vaccination. Practitioners are urged to be on the look-out for cases, and to seek advice from the regional or central medical staff of the Ministry of Health and the L.C.C. if in any doubt as to the nature of an eruption.

Week Ending February 26

The returns of infectious diseases during the week in England and Wales included: scarlet fever 1,948, whooping-cough 1,810, diphtheria 690, measles 1,796, acute pneumonia 858, cerebrospinal fever 75, dysentery 234, paratyphoid 6, typhoid 7. The deaths from influenza in the great towns numbered 46, an increase of 8 on the total of the preceding week.

Points from Abroad

According to a statement in the Swedish press last month Berlin is suffering from a plague of rats because refuse has not been removed for months. There is fear of contagious diseases, and hundreds of cases of tularaemia have already occurred in Berlin, although there had not been a single case for decades.

Last month about 5,000 cases of plague were reported in Adrianople, and quarantine restrictions were placed by Turkey on those crossing the Bulgarian frontier.

No. 7

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the Britsh Isles during the week ended Feb. 19.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1944					1943 (Corresponding Week)				
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	67	1	33	1	3	96	9	27	5	3
Deaths		1	2				2	1		
Diphtheria	689	29	188	158	28	828	38	188	96	32
Deaths	11	1	4	6	1	25	2	5	7	1
Dysentery	277	61	141	—	—	89	7	38	—	—
Deaths				—	—				—	—
Encephalitis lethargica, acute	—	—	1	—	—	—	—	1	—	—
Deaths		1					—			
Erysipelas			39	18	2			62	6	2
Deaths		—					—			
Infective enteritis or diarrhoea under 2 years				6					14	
Deaths	55	13	9	12	8	45	7	10	11	4
Measles	1,620	226	147	324	1	18,215	1,182	363	21	52
Deaths	1	—	1	1	—	24	—	—	—	1
Ophthalmia neonatorum	88	5	21	1	—	87	2	17	1	3
Deaths										
Paratyphoid fever	3	—	2 (B)	—	—	7	—	1	1	—
Deaths	—	—	—		—	—	—	—	—	—
Pneumonia, influenzal*	974	46	9	6	5	1,399	73	30	5	8
Deaths (from influenza)	38	9	7	1	—	102	13	10	—	6
Pneumonia, primary			199	23			55	415	24	
Deaths		33		21	11				11	14
Polio-encephalitis, acute	—	—				—	—			
Deaths		—					—			
Poliomyelitis, acute	8	—	—	—	—	5	—	—	5	—
Deaths		—								
Puerperal fever		4	10		—		3	17		—
Deaths										
Puerperal pyrexia†	167	5	14	—	4	146	9	21	2	—
Deaths		—								
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	2,063	115	216	32	60	1,922	134	300	41	47
Deaths	1	—	—	—	—	1	—	—	—	1
Smallpox	—	—	—	—	—	—	—	—	—	—
Deaths				—	—				—	—
Typhoid fever	6	—	1	9	1	6	2	3	7	—
Deaths	—	—	—	—	—	—	—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths				—	—				—	—
Whooping-cough	1,825	173	124	74	17	1,581	118	143	54	9
Deaths	9	2	—	1	1	16	4	1	3	—
Deaths (0–1 year)	401	50	61	47	46	434	47	77	59	22
Infant mortality rate (per 1,000 live births)										
Deaths (excluding still-births)	4,984	769	653	259	169	5,200	752	742	265	165
Annual death rate (per 1,000 persons living)			15·0	16·9	‡			16·7	17·4	‡
Live births	6,466	749	910	409	308	6,386	780	910	342	289
Annual rate per 1,000 persons living			18·5	26·7	‡			18·6	22·5	‡
Stillbirths	226	32	29			231	19	40		
Rate per 1,000 total births (including stillborn)			31					42		

* Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

† Includes puerperal fever for England and Wales and Eire.

‡ Owing to evacuation schemes and other movements of population, birth and death rates for Northern Ireland are no longer available.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1.

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ANY QUESTIONS?

The Carotid Sinus and Carotid Body

Q.—*What are the physiological functions of the carotid sinus and carotid body, and what is their clinical significance?*

A.—The carotid sinus and carotid body are concerned with the reflex regulation of arterial blood pressure, heart rate, and respiration. Nerve endings—stretch receptors—in the adventitia of the carotid sinus are responsive, as are similar endings in the arch of the aorta, to changes in arterial blood pressure. They are stimulated according to the pressure exerted on the walls of the vessels; when they are stretched impulses pass, in the case of the carotid sinus, via the sinus nerve to the vasomotor centre and inhibit its tonic activity. As a result an increase in pressure in the sinus is followed by widespread vasodilatation. Reflex slowing of the heart and of breathing is also induced through the cardiac and respiratory centres by an increase in sinus pressure. The usual constancy of the arterial blood pressure is attained mainly by reflex action induced through the sinus and aortic nerves—the two nerves are indeed often referred to as "buffer" nerves.

Associated with the sinus is the carotid body containing chemoceptors which are stimulated by blood-CO_2 tension rising above, and O_2 tension falling below, threshold levels. Stimulation of the receptors results, reflexly, in increase in vasomotor centre tone and stimulation of breathing. The aortic bodies react similarly. The removal of CO_2 and the maintenance of its optimum level and the supply of oxygen to the organism are therefore important functions of the carotid body. For details and experimental proof regarding these mechanisms the questioner is referred to Wright (*Applied Physiology*, 7th edition).

Clinically the sinus (and aortic arch) receptors are largely responsible for the maintenance and regulation of arterial blood pressure. Experimentally, hypertension can be induced in animals by section of the sino-aortic nerves, but there is little evidence that essential hypertension in man is due to dysfunction of the sinus mechanisms. Hypersensitivity of the carotid sinus reflex may be responsible for some forms of vasovagal fainting attacks. Subjects of this condition are characterized by the abnormal slowing of the heart which ensues from light or moderate pressure exerted on the neck over the carotid sinus region.

Bilateral Recurrent Parotitis

Q.—*A patient aged 37, a Sino-Portuguese by birth, was born in Macao and has spent many years of her life in India. She has complained for the last three months of an intermittent swelling and pain at the angles of her jaw. On examination I have found that both parotid glands have been swollen, the right more so than the left. The swelling subsides so rapidly that on the day after I saw her the surgeon to whom I took her could find no swelling. There are no stones in the parotid duct, and there is no inflammation visible at the mouth of either duct. Can you suggest (a) the cause of this chronic parotitis, or (b) any investigations which might be made and which might throw further light on the complaint? I do not think for a moment that she has a mixed parotid tumour.*

A.—The case is almost certainly one of bilateral recurrent parotitis. Bacteriologically, the majority of such cases are caused by the *Str. viridans*, with smaller groups caused by pneumococci, etc. The parotid secretion in such cases becomes turbid, and from time to time the ducts are blocked by small blobs of muco-pus and epithelial cells. A few of the cases, particularly those in which the parotid swellings appear and disappear very rapidly, have been considered as possibly allergic in origin, but a bacterial infection is usually present. Between the attacks the anterior border of the parotid is often much more easily palpable over the masseter muscle than in normal patients. The most useful investigation is the catheterization of the parotid duct, preferably whilst the gland is swollen. For this a fine glass cannula and bulb are necessary. In the typical *Str. viridans* cases the saliva is turbid due to large numbers of minute blobs of muco-pus. Direct examination of these blobs shows pus cells and columnar and pavement epithelial cells, often with intracellular organisms. In pneumococcal cases the saliva is usually more uniformly turbid. Cultures should also be made of fluid obtained by catheterization. Further information may also be gained by taking a sialogram after the injection of lipiodol into the duct system. In the individual case treatment must be based on the information obtained from these investigations. Suppurative complications do not occur in the *Str. viridans* group, but subacute and loculated abscesses may develop in connexion with pneumococcal infection.

Registration of Maternity Homes

Q.—*A widow, having some experience of maternity but no qualifications, and a spare room in a well-equipped and well-run house, has for the last two years been taking in maternity cases, mainly the wives of absent soldiers who have difficulty in finding domestic help to enable them to have their babies at home. Confinements, anter-natal and after-care have been carried out by a district midwife and doctor. She has now been informed by a representative of the county medical officer that she may not continue to do this as hers is not registered as a nursing home, and cannot be so registered without a resident qualified midwife. She is, however, at liberty to go to the homes of mothers to look after the domestic side of confinements. This she cannot do, as she has some family of her own to look after. I shall be glad of an opinion on the legal side of this problem.*

A.—The lady has obviously been keeping a nursing home within the meaning of the Public Health Act, 1936, ss. 187–95. A nursing home includes a maternity home, which means any premises used or intended to be used for the reception of pregnant women or of women immediately after childbirth. The Act makes the M.O.H. of the county or county borough primarily responsible for seeing that the nursing homes of his area comply with its provisions. The control of such activities as the question describes may seem vexatious in such a case, but it is clearly necessary in order to check wholesale abuses such as baby-farming and criminal abortion. A nursing home is therefore illegal unless it is registered with the local authority, who may refuse registration for various reasons, among which is failure to provide a properly qualified superintendent and staff. Section 187 lays down explicitly that the nursing in a maternity home must be superintended by a qualified nurse or a certified midwife. On the other hand, although the Act says that a nursing home other than a maternity home must have a resident medical practitioner or qualified nurse, it does not impose this requirement on maternity homes. If, therefore, the sole objection of the local authority to registering this lady's house is that she has no resident qualified midwife, the authority appears to be exceeding the powers of refusal given it by the Act. Her proper procedure, if she cannot get the M.O.H. to agree with this view of the law, is to apply for registration. If the authority desires to refuse, it must give her a clear fortnight's notice in writing, with its grounds of refusal. If then she writes within a fortnight and asks for an opportunity for showing cause against the refusal, the council must give her one. If it then refuses, she is entitled to a free copy of the order, and she may appeal against it to a court of summary jurisdiction—the local bench of magistrates. The order must inform her of this right. If the bench takes the view that the council is exceeding its powers, it may order the council to license her. She should not admit any more mothers until she obtains her licence.

What is a Vaccine?

Q.—*(1) What is a vaccine? (2) What is a non-bacterial vaccine? Does a mixed inhalant solution composed of dusts and pollens, etc., and used in desensitizing an asthmatic come under the latter category?*

A.—By derivation the word vaccine means something obtained from a calf, and for many years vaccination meant nothing else than the process of immunization against smallpox by inoculation with the virus of vaccinia obtained from lesions in that animal. With the advent of other methods of immunization the same terms were also unfortunately used for other materials and proceedings, and a definition of the word vaccine which would be generally accepted now is "a suspension of killed or attenuated micro-organisms used for immunization." Whether the meaning of the term should be extended still further to embrace agents of non-microbic origin used for purposes of immunization or desensitization is perhaps a matter of opinion, but respect for the long-accepted meanings of words condemns such usage, and the answer to the first clause of the second question is that there is no such thing. A pollen extract remains a pollen extract whatever may be done with it, and there is no good scientific reason for calling it anything else. If a general term is wanted to cover agents of this nature, another much-abused word, "antigen," may correctly be applied to them.

Flatulence and Fluids

Q.—*In the case of cardiac affections we are taught that light solids form the best diet because fluid food is likely to cause flatulence. This would seem to exclude soups. Upon what physiological or pathological grounds do we base our view that fluid foods—e.g., soups—cause flatulence? If soups cause flatulence, is it gastric flatulence or intestinal flatulence?*

A.—There is not the slightest evidence to support the tradition that fluids cause either gastric or intestinal flatulence. The excess of gas present in the alimentary tract in heart failure, cirrhosis of the liver, and chronic bronchitis is caused by deficient absorption the result of venous congestion. Possibly some gas even passes from the blood into the lumen of the stomach and intestines. Dietetic restrictions have little effect, but it is worth while reducing the intakes of potatoes, other root vegetables, and rice, though this does not lead to anything approaching the relief it gives to the colonic distension of intestinal carbohydrate dyspepsia. Diastatic ferments are useless; a tablespoonful of powdered charcoal taken twice a day may help a little; but the only effective treatment is relief of the venous congestion by treatment of the primary condition. If the flatulent distension causes pain and the patient is constipated, complete evacuation of both faeces and gas from the colon can be obtained within a few minutes by the injection of 1/2 c.cm. or less of pitressin if this is not contraindicated by the condition of the heart.

Unexplained Exhaustion in Women

Q.—*A few of my women patients, though not anaemic, have a poor reserve of strength. Their diet and environment are satisfactory and they have never had serious disease, yet a small walk exhausts them, and they are as tired on waking as at bedtime. Physical examination gives no clue.*

A.—Cases of this kind are not uncommon and they tend to be treated for intestinal toxaemia, focal sepsis, hormone deficiency, or avitaminosis according to the prevailing fashion or the date of graduation of the therapist. The tendency nowadays is to regard them as cases of depression, but the early onset, the trivial psychological strain, the absence of remissions, and the small success of psychotherapy make this explanation a little doubtful. Nevertheless encouragement and an interesting occupation are important elements of treatment. Small doses of benzedrine (amphetamine), 5 mg. at breakfast and midday, may also be tried.

Gold Treatment of Rheumatoid Arthritis

Q.—*A woman aged 54 years had rheumatic fever with endocarditis 20 years ago and made a good recovery. In the past 10 years she has developed rheumatoid arthritis, especially in the interphalangeal joints of the fingers, and there is definite rheumatoid arthritis of the knees. Would "gold" treatment of this condition be beneficial, and in what doses and how would I administer it? The pain is not excessive, but the condition is progressive and threatens to be crippling.*

A.—It is not uncommon to meet with a history of rheumatic fever in earlier life in cases of rheumatoid arthritis. In the case under consideration gold would appear to be well worthy of a trial, but a warning is necessary against its use without previous experience as the risks are real, and sometimes, in spite of close observation, unfavourable effects arise. A thorough blood investigation should be carried out for anaemia and sedimentation rate; the former, if present, will call for attention first, possibly by administering liver at the same time as the gold is given, and iron in any case. It is wise to begin with a dose of 0.01 g. if myocrisin is the preparation selected, and to increase gradually to 0.05, giving this at weekly intervals up to a total not exceeding 1 g. A careful watch for any signs of irritation of the skin or soreness of the mouth must be kept; the urine should be examined at frequent intervals and blood counts carried out; any decrease in the white calls may be a danger sign, and a lowered platelet count may be warning of possible haemorrhages, though these are one of the rarer complications. The wisest plan is for the patient to have the earlier stages of the treatment carried out in hospital or wherever skilled observation may be available. The method is fully described in the more recently published books on arthritis.

Sulphonamides and Rheumatic Fever

Q.—*I understand that sulphonamides have been used in the prophylaxis of rheumatic fever. Could they be used in the treatment of subacute rheumatic fever, and if so, in what dose, say, should sulphanilamide be given and over how long a period?*

A.—Sulphanilamide has been used during the winter months to prevent recurrent attacks of rheumatic fever. It is difficult to see how its value in this respect can be assessed under a period of many years. If it is effective it probably owes its efficacy to the prevention of the streptococcal tonsillitis which often precedes the reactivation of the agent responsible for rheumatic fever. There is no evidence that sulphonamides are of value in the treatment of subacute rheumatic fever.

Mercurial Poisoning

Q.—*Is there any likelihood of mercurial poisoning from prolonged use of mersalyl or salyrgan? A patient aged about 56 has a high systolic blood pressure and failing right ventricle, with consequent dropsy and oliguria. He has been having daily doses of 2 c.cm. for some time.*

A.—Mercurial poisoning is very unlikely to result from the prolonged use of mersalyl or salyrgan. Thus a case was recorded in this *Journal* by C. M. McIntyre (1943, **2**, 609) in which 680 injections had been given over a period of about 6 years with only occasional slight reactions which could be ascribed to mercury. Mercurial reactions, however, may occur. N. M. Keith (*J. Amer. med. Ass.*, 1936, **107**, 2047) says: "The distressing reactions that have actually been seen after the injection of organic mercury are stomatitis, diffuse dermatitis, diarrhoea, haematuria, and renal insufficiency. Luckily, these reactions are rare." It is a wise precaution to see that there is no oral sepsis in any case in which prolonged administration is contemplated. Cramps may occur in the legs due to deprivation of sodium chloride, and these are relieved by adding salt to the diet. In other cases the patient complains of feeling ill and tired after the injections. This is probably due to excessive dehydration, and disappears when the injections are given less often. In the case referred to here it might be advisable to try giving the injections at five-day intervals, judging the effect by the excretion of urine and weight of the patient. If this is not successful the administration of ammonium chloride by mouth, in doses of 30 grains four times a day for three days before the injection and on the day of the injection, may give satisfactory results with only one injection a week. Sudden toxic reactions are rare. They include such symptoms as headache, unconsciousness, and epileptiform convulsions, as was reported by C. T. Andrews in this *Journal* (1942, **1**, 24) in a case of heart failure in which kidney disease was excluded.

INCOME TAX

Cost of Air-raid Shelter

"JAY" expended £80 in building and equipping an air-raid shelter attached to the surgery of an industrial practice. He is informed that no allowance can be made on that account for income-tax purposes as the shelter was erected in connexion with a professional and not a "trade" concern.

*** That is correct. The underlying reason is that the special arrangements made to encourage the erection of shelters were intended for the benefit of employees, and therefore apply to factories, mines, and buildings used for commercial purposes, but not where the premises are put to professional use.

Pension from Abroad

C. M., who is now residing and practising in this country, is in receipt of a small pension derived from service abroad with a foreign shipping concern. Is he liable to pay British tax on the pension?

*** Yes; British residents are liable in respect of such incomes even though earned by foreign service.

"Pay as you Earn"

Earnings Assessed under Schedule D

M. Ls.' husband is a specialist; for the past eighteen months she has been assisting in a general practice, and her earnings have been included, for income-tax assessment, in one sum with those of her husband. Can she claim to come under the new system?

*** "Pay as you earn" applies only to earnings assessed under Schedule E. M. Ls.' earnings should not strictly have been assessed under Schedule D, because she is in employment and is not in general practice. The only way in which the benefit of cancellation of 7/12ths of the 1943–4 tax can be obtained is for M. L. to arrange with the inspector of taxes for the Schedule D assessment on her husband to be reduced by the exclusion of her earnings, and for Schedule E assessment to be made on them specifically.

Salaries paid to Partners

W. W. inquires whether there is any method by which a partnership may take advantage of this new system as regards "salaries" paid to partners.

*** No. The Income Tax Acts regard payment of such "salaries" as really an arrangement for the distribution of profits between the partners. The "salaries" are not deductible in arriving at the amount of the Schedule D assessment, are not assessable under Schedule E, and accordingly do not come within the new "pay-as-you-earn" system.

LETTERS, NOTES, ETC.

Thiouracil: A Warning

Dr. DAVID HALER (London, W.1) writes: In your reply to a question on the above subject (Feb. 26, p. 313) you state that no other toxic effects apart from a skin rash have been described. This is not a fact. Thiouracil is a dangerous drug, and at least half a dozen fatal cases of agranulocytosis have been described following its use, and only this week I conducted a necropsy upon such a case, the inquest resulting in a verdict of misadventure following the administration of thiouracil. In my opinion this drug should be given only under the strictest in-patient control, when full pathological and clinical facilities are available for full control of the case. I feel it to be of sufficient importance for you to give this warning adequate publicity.

Ephedrine and Argyrol in Normal Saline

Messrs. E. W. BARSTOW and T. D. WHITTET (pharmacists, Charing Cross Hospital) write: Following the letter of Dr. A. Piney (Jan. 29, p. 163), we have prepared solutions containing ephedrine and argyrol in normal saline without any difficulty, and we are surprised there has been trouble in the preparation of a satisfactory solution. A solution made with argyrol (Barnes) is indistinguishable from the proprietary article, and shows no precipitate after over a week, being bright and clear. A second solution prepared with argent. vitellin *B.P.C.* also appears quite stable after several days, and although not quite so bright as the first solution, it has no sign of a precipitate. The most satisfactory method of preparation is as follows. Dissolve the amount of argyrol in about half of the water required and the salt and ephedrine hydrochloride in another portion, mix the two solutions, and dilute to volume. The finished solution should be stored in a dark bottle. It is proposed to investigate this matter further, and submit a short paper to the *Pharmaceutical Journal*.

Paul-Bunnell Test

Dr. F. DURAN-JORDA (Manchester) writes: I notice that in the *Journal* of Dec. 11 (p. 771) there is a reply to a question concerning the Paul-Bunnell test for infectious mononucleosis. In the first paragraph of the reply there is a short description of the method, in which the reader is given to understand that by mixing the serum with a 2% suspension of sheep blood cells an agglutination is produced in small dilutions in any kind of serum, normal or abnormal. I have not seen any further correspondence on this subject which may have rectified the description, but I should like to point out that the serum should first be inactivated, because the mixing of fresh human serum with sheep blood cells produces haemolysis instead of agglutination, due to the fact that in the human serum there is normally an antihaemolytic factor against the sheep cells which acts when the normal-serum content of the complement has not been destroyed by heating.

Structure of Atropine

Dr. J. N. DAVIDSON and Dr. I. C. WHITFIELD (Aberdeen University) write: The similarity between pethidine and atropine as indicated in the paper by Drs. Gallen and Prescott (Feb. 5, p. 176) would be less marked if the structure of atropine were correctly presented. The formula shown is an ester of a tropane carboxylic acid, whereas atropine is, of course, the *dl*-tropic acid ester of tropine.

Photomicrography with Ordinary Cameras

Mr. O. L. WADE writes from Cardiff: I read with interest the article on this subject. Some of your readers might be interested to know that very effective cine-photos of microscopical preparations can quite easily be taken. In pre-war days I made a successful film of hydra and daphnia and other small pond life using a × 6 eyepiece and a 1/6-in. and a 1/3-in. objective. The light was a carbon arc lamp run off the house mains. The microscope tube was placed horizontally on a specially made holder. The preparation was clipped to the microscope stage, and to protect it from the heat of the lamp the light was passed through a glass jar of copper sulphate solution. The camera, in this case a 9-mm. Pathé, was applied to the eyepiece of the microscope; its casing was opened and the microscope focus adjusted until a sharp image fell on a piece of cardboard placed where the film lies during exposure. A little experimentation, exposing and developing only small sections of film, enables the optimum conditions to be found. We suffered great difficulty as we did not possess a two-way prism eyepiece, and were unable to view the field while exposing film. To ensure that the animals did not pass out of the microscope field we made a small cell 1 cm. by 1 cm. by 1/10 cm. on a microscope slide and pushed in a few strands of cotton-wool. This divided up the cell into small compartments and prevented the animals swimming outside the microscope field. The difficulty with very high-power work, 1/6 in. or 1/12 in., is to make the living cells show up against the bright light. I am hoping to have success in photographing phagocytic cells stained by Maximow's supravital stains (Sabin, Doan, and Cunningham, *Contributions to Embryology*, 1925, Nos. 82, 83, 84). I think it would also be possible to photograph living preparations as made by Covell (*Anatomical Record*, 1928, **40**), where the cells are excreting granules stained by dyestuffs injected intravenously.

Pin-hole Urinary Meatus

Mr. FAUSET WELSH, F.R.C.S. (Birmingham), writes: In your issue of Feb. 26 (p. 314) a questioner describes under the term "pin-hole meatus" a condition which I recognize as meatal ulcer. The answer given does not satisfy me, nor will it satisfy anybody who has to treat this troublesome little complaint. In the first place there is little doubt that the pin-hole meatus is caused by the meatal ulcer and not vice versa. The smallest meatus which we ever see in a child is the one found in hypospadias, but we never see spontaneous ulceration here. Again, ulceration of the meatus is not found in the uncircumcised child. It is very common after circumcision, though an interval of three months to eighteen months may elapse between the operation and the onset of ulcer symptoms. Lack of the protection normally given by the prepuce is responsible for ulceration at the lips of the meatus. Friction by the clothing or ammoniacal dermatitis are probably the other factors setting up the ulcer. A scab forms across the meatus and the child can urinate only by bursting this scab, a process accompanied by pain and the appearance of a few spots of bright blood. The scab then re-forms and the process is repeated. The ulcer will heal if, after micturition, a small square of lint smeared with a blob of medicament, such as ung. H.A.D., is placed over the meatus. Healing is sometimes accompanied by stenosis, and if the meatus is unusually small a meatotomy will be required. This is a very delicate operation.

Abdominal Injury and Intussusception

Mr. A. S. ALDIS, F.R.C.S. (senior assistant, Surgical Unit, Welsh National School of Medicine, the Royal Infirmary, Cardiff) writes: May I have the hospitality of your columns to seek information in connexion with a somewhat unusual case which has just come under our care? The patient is a boy aged 9 who was run over by a milk van, the wheel passing across his abdomen. There was little external sign of injury and the boy's condition was so good, with no abdominal rigidity, that operation was deferred. Twelve hours later the patient started to vomit and there was some visible peristalsis in the upper abdomen together with tenderness and a rising pulse rate. A laparotomy was performed and the boy was found to have a small rupture of the liver and some bruising of the pancreas. In a routine investigation of the other viscera he was also found to have an entero-enteric intussusception about three inches long near the junction of the jejunum and ileum. The small intestine above the intussusception was dilated, and below was in spasm. No other injury was found in the abdomen, the intussusception was easily reduced, and no abnormality of the bowel or haematoma of its wall was discovered to account for its occurrence. I would be most interested to know whether any readers have seen a similar association of abdominal injury and intussusception. It seems to me to be a true example of enterospasm initiating an intussusception.

Rare Medical Books

Dr. M. G. BASTIBLE (Stranorlar, Co. Donegal) writes: Under the heading "Rare Medical Books" (Jan. 22, p. 138) you mention some rarities now to be sold, among them being Moore's *Hope of Health* (London, 1564) and other similar manuscripts. Some of your readers may be interested to know that the Government Publications Department in this country has a team of scholars working on unpublished Irish texts, some of which have already been reprinted at a very moderate price. The most recent of these is the *Regimen Sanitatis Magnini Mediolanensis*, containing both the Latin version and the Gaelic translation. In a scholarly introduction (in English) the editor says: "The large body of mediaeval Latin medical works has generally an interest only for the specialist in the history of medicine, while early translations of such texts into the several European vernaculars have mainly interested lexicographers. If this fourteenth-century *Regimen Sanitatis* of Magninus, a doctor of Milan, were to make further claim it would be on the student of the social history of the period; a rule for the preservation of health, it has necessarily a broader compass than works on the treatment of specific diseases or conditions. . . . Early translations of such texts into the vernacular may be of importance in establishing a critical Latin text, and in this connexion it might be noted that the earlier of the two extant Irish MSS. of the *Regimen* (P, dated 1469), though not the original translation, is earlier than any printed edition; indeed very little over a hundred years, and very possibly less, may have elapsed between the writing of the *Regimen* and its translation into Irish." For the Latin text the editor has used two printed editions in Trinity College, Dublin: "The earlier version (J) was printed in Paris by Felix Bagault for Claude Jaumar and Thomas Julian; the edition is undated but is treated by bibliophiles as an 'incunabulum' and given the approximate date 1500." (*Regimen na Slainte*, etc., 2 vols., editor, James Carney; publishers, Irish Government Publications, 3–4, College Street, Dublin.)